

J. Jeffries
LETTERS,
London **ON THE** *May 1781.*
Force of Imagination

IN
PREGNANT WOMEN.

Wherein it is proved, by
INCONTESTIBLE ARGUMENTS,

Drawn from both
REASON AND EXPERIENCE,

That it is a ridiculous prejudice to suppose it possible for a pregnant woman to mark her child with the figure of any object she has longed for.

L O N D O N:

Printed for W. GRIFFIN, in Fetter-Lane.

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of Boston.

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P R E F A C E.

MANY persons of learning have endeavoured to overturn the common prejudice of the force of imagination in pregnant women. Among others, Doctor Blondel has wrote on this subject, but not in a manner likely to instruct or convince the fair sex. His treatise wants the method and simplicity necessary to conduct step by step, to a knowledge of physics, persons whom we must suppose but very little initiated in the principles of this science : besides, he denies, or conceals, almost all the facts which seem to authorize this opinion. These facts do not depend on the force of imagination ; but they for the most part, are indisputable, and they always strengthen this prejudice, till their true cause is ascertained. The
memoirs

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memoirs of the Royal Academy of Sciences, contain many dissertations on this subject, worthy of their learned authors; but as they always suppose certain principles, with which physicians only are acquainted, they seem to be very ill calculated to inform those who are entirely ignorant of these principles. The ladies will, I hope, forgive me, if I rank them in this class. Philosophical works, designed for their instruction, such as the question I propose to examine here, should be treated differently from a dissertation.

A work of this kind, (proper for their inspection,) is the more difficult to execute, as it is necessary to reunite physical and anatomical knowledge; to establish principles with simplicity, to connect together their consequences with a scrupulous exactness, and attach the mind to abstract objects, by rendering them intelligible and pleasing by the manner of treating them. I flatter myself that these
letters

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letters, in which all these advantages are united, will produce an happy effect, as they have already rooted out this prejudice in the minds of several ladies to whom they have been already communicated by the author.

LETTERS,

THE HISTORY OF

the city of London
from the first settlement
to the present time
by John Stow
1618

Printed by I. I. for I. I.
at the sign of the Gunne
in St. Dunstons Church
in London

1618

LETTERS,

ON THE

Force of Imagination

IN

PREGNANT WOMEN.

LETTER I.

A general explanation of the reasons why the force of imagination in pregnant women, is an opinion prejudicial to both the mother and infant.

MADAM,

YOUR observation, that every prejudice should not be regarded equally alike, is just, and, I acknowledge my error in confounding the force of imagination in pregnant women, with a thousand other prejudices, which appear ridiculous at first sight. The

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Eastern nations, perswaded of the possibility of bewitching children and lying-in women, think to preserve them from witchcraft by hanging pieces of money, and coloured glass, over the childrens foreheads, and putting a clove of garlick amongst the jewels, which lying-in-women wear on their heads. The least shadow of common sense, is sufficient to convince us, that this prejudice is entirely destitute of reason. But it is not the same with respect to the force of imagination in pregnant women. Credulity in this case seems founded on experience, and to avoid this mistake it is absolutely necessary to possess some advantages of education, which it is not in the power of every one to acquire. Yet notwithstanding the numerous advocates for this prepossession, it ought to be regarded as a prejudice of the worst consequence, since it affects the fair sex, during their pregnancy: uneasy, and alarmed at the least accident, they lose their chearfulness, peace of mind, and repose. The blood is vitiated, becomes prejudicial to the infant, and thro' the fear of imaginary misfortunes they suffer real ones. The good of mankind in general, and the interest of the ladies in particular require this prejudice to be
publickly

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publicly exposed and refuted: and I should, madam, with the greatest pleasure, give you my opinion on this subject, did I not think it an improper subject for a literary correspondence with a lady, but since you insist on my acquainting you with the reasons which have induced me to adopt an opinion that to you appears singular, permit me to remind you, of the conversation which gave occasion to your letter.

I asserted that pregnant women could not mark the infant in the womb, with the figure of those things which particularly affected them, or they longed for, because the mother cannot communicate her ideas, her apprehensions, or fears, to the infant, and that even if this communication was possible, and the infant sensible of the mother's passions, yet the child could not experience any other effects therefrom, than those which the mother herself experienced, and since there never was an instance of the mother's being marked herself with the figure of what she longed for, or was particularly affected by, it was equally impossible for the child to be marked with those objects. All the external marks which have been ridiculously ascribed to the force of ima-

gination, are the consequences of the mechanism, which fecundates the egg, that incloses the first rudiments of the infant. The laws of this mechanism, analogous in animals and plants, produce in both the same effects. If we see warts and blemishes in the bodies of children, if some are born with hands like a goose's foot, if two children are entirely or in part united together, if a child comes into the world with superfluous parts, or wants an arm, an hand, or even an head; the vegetable creation has likewise warts and blemishes; the branches of trees unite together, and being inclosed in the same bark, form but one stem; other branches are entirely effaced. This variety in plants cannot be ascribed to the force of imagination. Nature is the same in all her productions. Every thing is fruitful, is nourished, and grows in the same uniform manner; there is no difference between the animal and vegetable creation in the ordinary course of nature. Accidents should therefore be referred to one common cause. The blemishes which affect the bodies of children, and the same deformities observed in plants, must depend on the same principles, and the one cannot with
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the least shew of reason, be attributed to the force of imagination, since the force of imagination cannot possibly be the cause of the other.

I shall confine myself, madam, to these general heads, a more particular enquiry would lead me into reasonings of too serious a nature, it would even require some knowledge of anatomy; 'tis true, a very slight acquaintance with anatomy would suffice, it is sufficient to know that the arteries and veins are the canals thro' which the blood circulates; that the arteries receive the blood from the heart, and distribute it to every part of the body, from whence it is returned back to the heart by the veins. That the nerves are strings which take their origin from the brain, and being ramified, are spread over the whole surface of the body; that these nervous filaments contain a fluid separated from the blood, in the brain, so spirituous and subtle, as to have obtained the name of animal spirits; lastly, that these nerves are the principal organs of sensation. These names of arteries, veins, and nerves, are too common for you to be ignorant of them, and a very little application would give you a sufficient knowledge of their use for the present occasion. But,

madam, I assure you once more it is with the greatest reluctance, that I can resolve to make this the subject of our correspondence.

I am madam, &c.

LETTER II.

The necessity of being acquainted with the mechanism by which external objects affect our senses, to form a right judgment on the force of imagination in pregnant women. This mechanism explained.

PERMIT me, madam, to complain of the injustice of your suspicions. I am far from imagining a lady incapable of philosophical reasonings; and I entertain no unfavourable ideas of the fair sex from their usual employments; I am sensible, if they take diversions which appear trifling, it is our fault alone, they use the only resources against idleness, which our vanity, or at least our precaution in denying them the study of the sciences, has left them. How absurd to think those studies improper for them? the fair sex possess a delicacy of understanding, superior to the men; a lively imagination

L E T T E R II.

imagination capable of investigating first causes, and are seldom mistaken in their conclusions. If I spoke of you only, madam, I might with truth say more, I know the education you have received, and the advantages you have been prudent enough to reap from it. Can I then have any fear of your not understanding my arguments? no madam, I am only afraid, that a subject abstruse in itself, should become tiresome in passing thro' my hands; but at last, you insist on being obeyed, your pregnancy, your apprehensions, your commands leave me no excuse; I shall therefore first of all give you an idea of the nature of the soul, and the manner by which it perceives external objects, and explain how it produces in our bodies the different movements, dependant on its will. With respect to the nature of the soul you know as much as the greatest philosopher. It is a spirit, immaterial, has nothing which resembles matter, without shape, cannot be seen, nor felt, yet it is united to the body by the power of the supreme being; and in consequence of this union, and the effects produced in our organs of sense, the soul thinks, and the body moves accor-

ding to the different inclinations of the soul, dependant on its will.

Tho' we cannot comprehend the essence of the soul, nor the laws by which it is united to the body, yet we can at least discover, which parts are the organs of sensation, the connexion between these parts and external objects, and lastly, what impressions these objects make on them: we shall pursue this enquiry in one of our senses only, because, according as we fix our ideas to one single point, they become more simple and intelligible. An external object, for instance a flower, presents itself to your view, the soul perceives it, and acquires an idea of it. By what mechanism is this sensation brought about. 'Tis thus, there is a very subtle fluid, which you cannot perceive, between the flower and your eye, which is in continual motion, and striking against the surfaces of all bodies, is reflected by them. A part of this fluid reflected by the surface of the flower, meets your eye, and makes an impression on the nerve whose expanded filaments form a kind of lace work at the bottom of the eye, which is called the retina; these nervous filaments, as has already been remarked, are filled with a subtle fluid. The matter reflected

ted by the flower when it reaches these filaments must necessarily compress them, and it certainly cannot compress them without lessening the diameter of the tubes which contain the animal spirits, the consequence of this must be, that the animal spirits running back towards the other extremity of the nerve, escape thro' the outlet, and if they meet in their passage any nervous fibres, they irritate, and make them vibrate, and in consequence of this last vibration of the fibres of the brain, the soul is affected, is sensible of the object, and acquires an idea of it; this is the whole of what passes in the brain with respect to vision; for what has been observed of the flower, may be applied to any other visible object: there is always a fluid reflected, which makes a compression on the nervous filaments of the retina, and the animal spirits returning towards the brain irritate the nervous fibres, they meet with in their passage; but all objects do not make the same impression, this subtle matter is reflected variously according to the different surfaces of objects. Their size, shape and colour modify it differently, and being differently reflected, it affects different filaments of the retina, and compresses them

them with more or less force, or compresses a smaller or greater number of them; whence it happens that the animal spirits which are returning towards the brain by different nervous filaments, meet in their passage, and vibrate, different fibres of the brain, in the same manner as the jacks of an harpsicord, which strike different strings, according as you touch different keys. 'Tis thus the soul distinguishes one object from another, and never mistakes, for every different object makes its particular impression on the brain, and this impression can never be renewed but on account of the same object, or some other which exactly resembles it.

'Tis by this mechanism the soul perceives every object which surrounds us, and tho' the necessity of knowing them under different circumstances, has required different organs of sense in the human body, to receive the different impressions, yet all these impressions terminate in an irritation of the nervous fibres of the brain. Sonorous bodies cause a vibration of the air; this air, whilst in motion, strikes the drum of the ear, and by the peculiar mechanism of the internal structure of the organs of hearing, the nerves
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of the ear are compressed, and the same phenomena are the consequences, as we observed when treating of vision. 'Tis the same with smelling; the odorous particles which exhale from bodies of a strong scent, are carried by the air to a very delicate membrane, which lines the inside of the nose: the nervous filaments which are spread over this membrane, are hereby compressed, and by the reflux of the animal spirits, and the irritation of the fibres of the brain, the soul possesses the idea of smell. It is entirely useless to run over the other senses, since the same mechanism prevails in all. The external impression of those bodies which are the objects of our senses, terminate always in an irritation of the fibres of the brain.

I fear madam, you will complain of the length of this letter, but to prepare you for a candid examination of the force of imagination, it was necessary you should be acquainted with the mechanism which excites ideas in us, at the presence of an object. This must be the same in the mother and the child likewise; whether this assertion holds good, I leave to your own judgment to determine. I have avoided entering into a discussion of
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any particular system, since the learned are agreed that external objects make an impression on our eyes, by the means of a subtle matter which fills the space between our eyes and the object, and that this impression terminates in an irritation of the fibres of the brain. The difference of their systems consists only in the manner in which this impression is communicated from the eye to the brain, whether it is by the vibration of the nervous fibres of the retina, which are spread over the bottom of the eye, or rather by the reflux of the animal spirits; these questions might have embarrassed you a great deal, and would have been entirely useless, since whatever system you embrace, the consequences are the same in them all. My intention is to explain this subject in the most simple and intelligible manner, for which reason I have carefully avoided technical terms, and an exact account of optics; for to say the truth, madam, were you acquainted with the most intricate points in optics, you would not be advanced a single step further, towards the end of your present enquiry.

I am, &c.

L E T T E R

L E T T E R III.

The cause of those rapid impressions which external objects sometimes occasion in the soul. The reason why our ideas and tastes vary concerning the same object.

I Agree with you, madam, that reasonings which have no connexion with sensible objects, strike our imagination but very little, at first; one must be accustomed to this way of arguing, before it is possible to make one's self master of their whole force; I am unwilling you should find my letters too serious, and since your harpsichord has without fatiguing you, made you sensible of what I have already had the honour of explaining to you; let us follow the comparison, and thereby not only fix the knowledge you have acquired, but procure you some further insight into the subject before us.

You know, madam, that you can either form a simple sound, or make compleat harmony with your harpsichord; in the same manner an object can excite in us a single or a compound idea. In either case, it happens that one single
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string only was struck, or that many were put into motion at the same time; the same mechanism takes place in the eye, as the harpsichord. Please to recollect that the nervous fibres, which applied close to one another, spread over the bottom of the eye, I have already acquainted you, are called the retina; these, with your permission, I shall call the ocular keys. The matter reflected from objects, may affect only one of these fibres, the same as you can strike one single key of the harpsichord only, hence can happen but the vibration of one single string, either in the brain or harpsichord; but just as the hand can touch at the same time, several keys of the harpsichord, so the reflected matter of objects can have the same effect on the ocular keys. The vibration of several chords of the brain produces compound ideas, in the same manner as harmony is composed of a great many sounds. But whether the ideas are simple or compound, as it is necessary to repeat the same sounds, to strike the same keys of the harpsichord; so, to renew the same ideas, it is necessary to repeat the vibration of the same fibres of the brain, which at first excited those ideas. The vibration
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of every other string would neither produce the same sound, or the same idea. I flatter myself I have explained this sufficiently, therefore I shall proceed to the examination of other objects more interesting. We judge at first sight, if an object pleases or displeases us. On what does this depend? by what rule do we determine? I do not speak of those actions which reason alone examines, considers, and determines upon; I mean those instantaneous ones, where, without time to consider, we are affected by the object so quickly as to appear entirely mechanical; I believe it is so in fact; our necessities have perhaps required that we should not always be obliged to reason.

I imagine madam, that nature has provided for this case, by establishing in the organs of sense, and consequently in the chords of the brain, rules of harmony and discord. By this means, an object whose impression makes a perfect concord on the ocular keys, pleases the soul. An object whose impression forms a discord, is disagreeable; hence the different degrees of impression, which makes objects agreeable or displeasing, a variety infinitely greater than can possibly result from the different combinations of the harpsichord. This rule, you will say, madam,

madam, varies in every body. No, the rule is invariably the same; but, according to the difference of the ocular keys, and chords of the brain, an impression which in some persons makes a perfect concord, will make in others a discord. 'Tis the fault of the instrument, the variety of the organs only can vary our perceptions and tastes; mankind finds every thing good, useful, and agreeable, which forms a perfect concord on the senses; this is the regulation. But every thing which forms a concord in one person, does not produce it in another. Hence appears the difference of the organs of sense, without which we should be at a loss to account for those changes which every thing about us produces in our bodies. We know by experience, that a violent fever reverses our ideas, and causes us to dislike those very things which in a state of health we were most fond of. Our mind is nevertheless the same, but the ocular keys being put out of order, are become incapable of those agreeable sensations which are natural to them; and when vibrated, form discords only. Betwixt this excess, and their natural state, there is a middle one to which we do not sufficiently attend; I have seen people endeavour

your to find out the cause of a person's bad temper, and desirous of guessing what the person himself was ignorant of. This cause perhaps depended on some small change of the air. You ought not, Madam, to think this extraordinary; the air makes a strong compression on our bodies; an animal placed in the exhausted receiver of an air pump, swells, and soon dies. The air undergoes many changes which cause an alteration in its weight, we do not externally know this difference, but it is nevertheless certain that our circumference varies proportionably to the state of the air, our vessels are more or less dilated, the circulation of the blood is more or less quick, and all these variations influence the organs of sense, and necessarily cause a difference in our perceptions and tastes; fortunately these changes are not sensible to a particular degree, in every body, but they really exist, and it is easy to convince yourself of it by your own experience. What has been already said appears to me, to prove that every thing which excites in us an idea, makes an impression on us, different from that of every other object, and that it is impossible to renew an idea, without a repetition of the impression, which first

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excited that idea. That we are not all subject to the same passions, because the organs of sense are differently disposed in different persons, and that the least change which happens in those organs, is sufficient to vary our passions. And that the same object cannot excite the same effect in two different persons, unless the organs of sense are exactly formed alike in them both, and receive exactly the same impression.

To communicate the ideas and passions of the mother, to the child in her womb, it is indispensably necessary that the animal spirits, which with a certain determination received from the external object, have put in motion a fibre or fibres of the mother's brain, and excited an idea in her, should pass with the same determination to the brain of the child, and put in motion the fibres, exactly in the same manner as excited the idea in the mother; and also an exact conformity of the organs of sense must exist in them both. Whether these circumstances take place or not, I purpose to consider in my future letters.

I am, &c.

LET.

L E T T E R IV.

The animal spirits lose the determination they received in the organs of sense, when they are sent from the brain towards different parts of the body. The manner in which memory is excited.

THE difference between the firmness of the brain of the mother, and the weakness of the brain of the infant in the womb, convinces you madam, that the mother cannot communicate to her child those longings which affect her. But this madam, is allowing too much, the advocates for the force of Imagination will tell you that the weakness of the child renders it indeed susceptible of a less lively impression, but that in proportion, the effect will be the same in both. A spinnet does not give so loud a tone as an harpsichord, but it gives a tone of the same kind. To decide this madam, recollect that to excite an idea in the soul of the mother, the animal spirits must vibrate a fibre of the brain; to excite this same idea in the soul of the infant, these same spirits which excited the idea in the mother must

pass with the same determination to the brain of the child, and there vibrate a fibre of the same kind with that, which excited the idea of the object in the mother.

But do the animal spirits which returning back to the brain stimulate its fibres, receive from external objects a determination unchangeable even when they are sent from the brain to different parts of the body? this is the decisive circumstance. What kind of impression, then, do external objects make on the animal spirits? I have observed that the nervous filament, which contains this fluid, being compressed, the spirits return back towards the brain. I see nothing more in this than the common progressive motion of a fluid. In consequence of a less or greater pressure, the reflux of the spirits will be more or less rapid, but always in a straight line, and if with this uniformity of motion, they excite different ideas, the reason is, that external objects compressing different fibres of the optic nerve put into motion different columns of the animal spirits, each of these columns passing into the interior parts of the brain by the different points whence these nervous fibres take their origin, meets with,
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and stimulates different fibres of the brain, and excites in the soul different ideas.

This motion excited by external objects in the animal spirits is very easily changed, such is the nature of all fluids, susceptible of every motion, that they no longer keep the same impression, when the acting principle ceases, or any obstacle presents itself, the air issuing from the pipe of an organ with a determinate motion, forms different tones which affect our organs of hearing, but when this air is mixed with the circumbient air, it loses its motion, and no longer retains the tone it possess; thus the animal spirits, which have irritated a fibre of the brain, mixing with the other spirits, lose entirely the first determination they received from external objects, and possess no other than the motion common to the rest of the animal spirits.

But if this determination, which external objects impress on the animal spirits, could subsist in the brain, it must undergo a change, when in consequence of our will, the animal spirits are sent from the brain to different parts of the body, they are not only conveyed there by a motion opposite to that by which in the organs

of sense, they return towards the brain, but they are also mixed and blended together with the blood, in the parts destined to motion; 'tis in this the action of the soul on the body consists, the soul wills, and the body moves, that is to say, in consequence of a law established by the supreme being, the animal spirits subservient to the pleasure of the soul, insinuate themselves into the finest recesses of the fleshy fibres, which are called muscles, and are the organs of motion, there mixing with the arterial blood, they occasion a contraction of the muscular fibres, in consequence of which the part is moved, to which the muscle is attached.

In this operation, a great part of the animal spirits escape from the body, and are dissipated, whence proceeds the weariness and weakness which follow violent exercise; the remainder of the animal spirits is mixed intimately with the blood, passes into the veins, and is returned by the usual course of the circulation, then the animal spirits form one common mass with the other parts of the blood, and possess no other motion, but what is common to the blood itself. Can it be supposed, that after these different motions,

tions, and mixtures, the animal spirits keep the same determination they received from the organs of sense?

But it may be objected, that if this determination by which the animal spirits excite in us ideas, cannot subsist, by what means are we furnished with ideas when our memory recalls the idea of the same objects tho' absent. I answer, memory is nothing but the return of an idea already conceived, an object has occasioned a vibration of a fibre of the brain, the renewal of this idea depends on the return of this same vibration, but it is not necessary that this second vibration should be occasioned by the same animal spirits which produced it the first time: by whatever animal spirits the vibration is renewed, the idea will be renewed likewise: when lost in thought we divert our attention entirely from external objects, the animal spirits collected in the brain are carried indifferently to all the nervous fibres, and putting them in motion, awaken in us the idea of a great many objects; 'tis in this sense it may be said, that whether asleep or awake the soul always thinks, since the animal spirits are in continual motion, and by this motion always irritate some fibres of the brain. But consider

madam, that from this motion there never results any sensible idea but what existed before in our mind. Every new idea supposes an object present to the organs of sense; this proposition is the more certain, since to represent the figure of an object we have never seen, we unite together the idea of a great many known objects, and if in our dreams we perceive images which never existed but in our Imagination, of whatever kind these monstrous ideas are, they are no otherwise so but from the oddity of their conjunction, all the parts which compose them, take their origin from a real object, and from an idea true in its principle.

Whatever I have said hitherto madam, on your ideas, and passions, regards only these ideas which external objects excite in us, and the passions which spring from the same objects. If the force of Imagination in the mother can mark the child in her womb with some external blemish, in consequence of an idea conceived by her, or of some passion by which she is affected, it can never happen on account of spiritual objects, I have therefore thought it most proper to confine myself to sensible objects, and you must refer to this head those general expressions

expressions which seem to comprehend every thing that can be the object of our ideas. 'Tis by facts confined to corporeal objects that we ought to examine the force of Imagination in pregnant women. I shall not conceal from you madam, that Mallebranche a French philosopher has maintained this communication of ideas betwixt the mother and infant in her womb. You may see it in his treatise entitled, 'an enquiry after truth: I shall take the liberty to send it you, and beg you will read it, you will meet with there every thing which can be said in favour of the force of Imagination. If afterwards I shall be happy enough to convince you of the absurdity of this opinion, you will more readily forgive yourself for having been in an error, when you reflect that this great man was mistaken in the same case.

I am &c.

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L E T T E R V.

Mallebranche's system of the Communication of ideas between the mother and the infant in her womb examined.

I THINK with you madam, that Mallebranche offers his opinion in a very ensnaring manner. His reasonings appear demonstrations to persons prepossessed in favour of the force of Imagination in pregnant women, perhaps less would have done ; tho' mankind in general love truth, the greatest part attach themselves to the appearance of truth only, their sluggish minds reject every thing which could conduct them farther, and submit readily to those opinions, which flatter their errors, and dispense with the trouble it would cost them to get rid of them. Judge from this madam, what an impression the authority of this philosopher must have on prejudiced minds. Let us not, however, suffer ourselves to be hurried away by the torment, let us allow the genius and learning of Mallebranche all the respect which is due to them, and acknowledge with gratitude, that he has released metaphysics from
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the obscurity and jargon of the schools, but at the same time that we follow his precepts and examples, let us consider truth, and submit to that alone. To prove the force of Imagination, Mallebranche saw the necessity of allowing a communication of ideas and passions, between the mother and child: children in the womb, says this learned man, must see and think as the mother does, because since the look of a passionate man makes an impression on those who behold him, it seems reasonable to imagine that mothers are capable of communicating to their children the same sentiments which they feel, and the same passions by which they are agitated.

How extensive is this principle, madam; the infant in the mother's womb is then sensible of hope, fear, hatred, love, desires, &c. participates of the overflowings of the heart, gives way to these consequences, abandons itself to passion, are surely sufficient to induce us to reject the principle from which they take their rise. Take notice madam, that this author compares two cases together which are not in the least alike; speaking of the ties which attach mankind to one another, and of the connexion betwixt the mother
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and child, he misapplies the term Union. How different is this union; our wants, our desires, our passions, unite us to the rest of mankind, hence proceeds our propensity to imitate them, and to make their pains or pleasures our own. Their looks, the state of their countenance express their thoughts, we know these thoughts, compare them together, and by a train of reasoning, participate those passions which affect them; such is the union of mankind with one another: of what kind is the union betwixt the mother and child? an union entirely corporeal, in which the soul has not the least share. The child wrapped up in several membranes, is confined in it's mothers womb, and is held there only by a long string, composed of sanguineous and lymphatic vessels, called the umbilical chord, attached by one end, to the mothers womb to establish a circulation betwixt them; can it then be supposed the child can perceive its mother, or be attentive to the motions which her passions impress on her countenance? by what means then can she communicate her thoughts to her child; no nerve passes from the mother to the child, it is only united to her by the sanguineous vessels: 'tis then by the
vessels

vessels only that she can communicate her ideas, supposing this to be true let us make an application of the principles we have established.

The mother sees a bunch of grapes, the subtile matter reflected from the surface of the grapes compresses the nervous fibres which are spread over the bottom of the eye, the animal spirits flow back towards the brain, irritate there one of the nervous filaments, and by this vibration give her the idea of the bunch of grapes, you are sensible madam, that to excite this same idea in the soul of the child, a fibre of the child's brain answerable to that of the mother's, must be vibrated. To effect this the animal spirits must come to the brain of the child exactly in the same state as they were when they affected the brain of the mother at the sight of the grapes. Having already proved that the animal spirits can pass no other way from the mother to the child than thro' the sanguineous vessels which compose the umbilical chord, let us consider the manner in which they pass, they must necessarily be sent from the brain to the muscles, there they must be intimately mixed with the blood, and circulate with it, till being at last carried
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into the capillary vessels, they pass into the winding umbilical chord which unites the child to the mother; after these different routs, they come to the child, and following the motion of the blood, begin a new circulation, till at last they are separated from the rest of the blood by the proper secretory vessels, and deposited in the brain of the child. Is it reasonable to imagine that the animal spirits mixed and blended so long with other fluids of a different nature, can have preserved their first impression, which was only a progressive motion towards the mother's brain. Then since the animal spirits must have certainly lost their first modification, which was the occasion of their exciting the idea of the grapes in the mother, they cannot excite in the child the same vibration, nor the same idea.

I presume madam these reasons are sufficiently convincing, but for all that, I have not offered them to you in their full force, I have supposed the whole portion of the animal spirits which has excited an idea in the mother, passed intirely to the brain of the child, and in spite of this supposition the most favourable that could be desired. I flatter myself I have proved that there cannot possibly exist any communication

munication of ideas betwixt the mother and the child in her womb : I should be able to maintain that hardly any at all of the animal spirits which excited the idea of the grapes in the mother, passes into the body of the child, the animal spirits intimately mixed and blended together with the blood, are dissipated so easily during a long circulation, and are distributed into so many arterial canals, that the portion destined for the child cannot be above a thousandth part. After this, let any one judge if any trace of the first disposition received in the organs of the mother can subsist in this remainder of the animal spirits, even supposing it was to pass with the blood into the body of the child, and was separated in its brain, a circumstance which cannot happen.

When this determination has been destroyed, it is impossible to be re-established in the brain of the child, and the mechanism which excites memory cannot take place in the child in the womb ; whatever irritation the animal spirits might excite in its brain, it could not refer that irritation to any external object, since its senses have never been struck by these objects. Every idea of external objects supposes an object present, or to have been
been

been present, if this is the case, the child in the womb cannot have any one of these ideas.

But supposing it could have ideas even of external objects independant of their presence, that the irritation of the fibres of its brain affected its soul in the same manner in which objects present themselves to our memory, nothing could result in favour of the force of Imagination, the animal spirits which might pass from the brain of the mother to that of the child, having necessarily lost their first determination, the ideas of the child could be excited by chance only, through the uncertain course of the animal spirits scattered over its brain, they could have no connexion with the ideas of the mother, nor could in the least depend on the force of her Imagination. There cannot then be any communication of ideas between the mother and child, I have endeavoured to give undoubted proofs of it, and I hope madam you will think them substantial enough to make amends for the length of this letter.

I am &c.

L E T.

L E T T E R VI.

Further proofs of the impossibility of a communication of ideas, betwixt the mother, and the child in her womb.

MADAM,

SINCE you are convinced that there cannot exist any communication of ideas betwixt the mother and the child in her womb ; I might dispense with a farther examination of the reasons alledged by Mallebranche, in support of his opinion, were I not afraid my silence might be looked on as a mark of disrespect to that great man ; perhaps also, his reasons have more weight than I imagine : this I leave to you to determine. He says in the sequel of the passage I have already quoted, that the body of the infant is one same body with that of the mother, they are the same animal spirits, the same blood ; sensations and passions are the natural consequences of the motion of the animal spirits and blood, these motions are necessarily communicated from the mother to the infant ; consequently the passions and sensations, and in general all

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the ideas of which the body is the cause, are common to both mother and child. I think madam, the following a sufficient answer to Mallebranche's assertion; the infant, tho' inclosed in its mother's womb, and nourished by the same blood, is not one same body with her, the soul of the mother cannot exert it's influence on the body of the infant, it cannot at it's pleasure stir a leg or an arm of the infant, or stop the motion of either. The infant has it's own proper organs, it has a soul of its own independent of the mother, it only adheres to the womb of the mother; from whence it receives it's nourishment as a plant does from the earth, and in this sense the infant and mother can no more be supposed one same body, than the plant, and the earth, from whence it receives it's nourishment.

But suppose we give up this supposition, and allow that the passions and sensations are the consequences of the motion of the animal spirits and blood, still we must never loose sight of this incontestible truth, that every object makes an impression on our brain proper to itself alone, which characterises and distinguishes it from every other object; and that
every

every sensation depends on a particular movement. It is not sufficient then to say that the animal spirits and blood are communicated from the mother to the child, it must be proved that the motion of the spirits and blood which by a particular determination has produced an idea, a sensation, or a passion in the mother, subsists the same when after this long circulation of the fluids, this mixture, this dissipation of it's parts, it at last arrives at the brain of the child, which must be absolutely impossible.

I may venture then to assert that I have proved to a demonstration that the mother cannot communicate to the infant in her womb, the ideas which struck her at the sight of external objects, and since every passion supposes an idea, the mother cannot consequently communicate those passions which affect her. I assert further madam, that the mother could not communicate her passions, even if she could communicate her ideas. In this case let us consult our own experience, the least local defect of the organs of sense, the least inattention, hinders our experiencing from an object, those impressions which its presence would occasion in us in other circumstances; and independant of every

local defect, and inattention, two different persons never experience the same sensations on account of the same object, there never result the same passions in both; this happens, as we have already observed, not from the difference of our souls, the soul is the same in every one, and at all times, but from the difference of our brain. The brain of every person is not wound up to the same pitch, nobody surely then will maintain the disposition of the mother's brain to be like that of the infant. The state of infancy even gives us room to suppose that the part of the brain designed for the operations of the soul is that which makes the slowest advances to perfection. What a prodigious difference between the perceptions of childhood and manhood, what a difference still, to carry the comparison further betwixt manhood and the child at its birth. From hence madam, judge the condition of the infant in its mother's womb; in a state so imperfect and so little susceptible of impressions, what proportion, what resemblance can be met with between the mother and infant.

After this, what becomes of the comparison which Mallebranche borrows to establish his opinion; he says we are
taught

taught by experience, that when we look attentively at any wounded person, the spirits are forcibly carried to those parts of our body which answer to those of the wounded person. Many people it is true are seized with affright and astonishment at the sight of a wound, self preservation is so deeply rooted in us that whatever presents to our view the image of evils we have reason to dread, affects, agitates and disturbs our spirits. Hence proceed those involuntary motions paleness, and swoonings, which sometimes are the consequences of compassion and fear; this fear, this dread of pain has so great an effect on some persons as to throw them into such an excess of terror as almost to equal a delirium, during which they imagine that they themselves feel what is only present to their eyes. But after all, what can be concluded from this supposition; the child, as is already proved beyond a possibility of doubt, cannot have the same ideas as the mother, nor is it affected by those passions which she herself experiences. From this minute the whole system of Mallebranche is overturned, and nothing at all can favour the opinion of this pretended force of imagination. But supposing this communica-

tion of ideas was as true and as certain as I think I have proved it false, I do not see what conclusion could be drawn from it in favour of the force of imagination in pregnant women, supposing in fact that the infant in the womb partakes of its mother's feelings, that like her it is moved to pity at the sight of a wound, or longs for any other object, yet the course of the animal spirits which excited in both mother and child the same idea, could not mark the body of the infant with the determinate figure of the object which excited the idea: but the discussion of this point shall make the subject of my next letter.

I am madam, &c.

L E T T E R VII.

Supposing a communication of ideas between the mother and child, yet the child cannot possibly be marked with the figure of those objects which struck the mother's imagination.

MAllebranche was right in supposing and endeavouring to prove the communication of ideas between the mother and child; if this communication
does

does not exist, the accidents which happen to the body of the infant cannot be the effects of the force of the mother's imagination, I have therefore used my utmost endeavours to refute this opinion, if I have succeeded, this system is already overturned. Be it how it will, I further advance, that supposing even this communication of ideas, the system of the force of imagination cannot exist; and shall endeavour to prove that the animal spirits which have excited in the soul of the mother and infant the same idea or the same desire, cannot mark the body of the child with the figure of the object which excited this idea, this sensation, or this desire. The imagination of the mother could not mark the child with the figure of any object but thro' the means of the blood or animal spirits; to mark the child by means of the blood, the general movement of the mass of blood, and the particular motion of its component particles, must be entirely subservient to the influence of the soul. Reason and experience convince us of the contrary, the blood circulates, the particles of the blood are divided, are reunited, and distributed to different parts, the body receives its nourishment

and growth from it: different parts of the body are deprived of it and perish, independant of our will. The imagination of the mother is equally weak with regard to the blood which passes to the body of the child, she can neither regulate the motion or quantity of it, she cannot stop those particles from passing, which occasion diseases or death to the infant. Every thing is according to the laws of a circulation entirely mechanical: hence it appears that the imagination of pregnant women cannot by means of the blood mark the bodies of their infants with the figures of those things which they longed for.

Nor can it be by means of the animal spirits; you will be satisfied of the impossibility of this madam, if I prove to you that objects which strike the soul by the means of our senses are not delineated and painted in the brain, as on canvas, and even supposing, contrary to all reason, that an object drawn on the brain of the mother, was also delineated on the brain of the child, the figure of this object nevertheless could not be represented on any external part, in consequence of the idea excited by this object in the mind of the mother and child; but

but before I enter into a detail of the proofs, it is necessary to remark, that objects are discoverable to our sight by their surfaces only, and afford the mind not the least knowledge of their internal structure. A pregnant woman may know the external figure of a particular fruit, as a gooseberry or grape, but she is neither acquainted with the number, disposition, or variety of its parts, and supposing that the mother's fancy could mark the child with the resemblance of what she longed for, this supposition can extend to those objects only which struck her imagination, and consequently to the surfaces only of objects before her eyes. We might employ elsewhere every consequence which results from this observation, one is sufficient for the present, which is, that we have only to examine the impression made on our senses by the surfaces of bodies.

I have remarked madam, several times, and am obliged to repeat it, that the surfaces of bodies reflect towards our eyes a subtle matter which penetrating the apple of the eye, compresses the optic nerve, and makes the animal spirits ebb towards the brain, these spirits escape from the tubes which contain them, and
cause

cause a vibration of those nervous fibres of the brain which they meet with in their passage. In the whole of this mechanism, nothing can be perceived but a greater or less change in the determination of the motion according to the force of the compression made on the extremity of the nervous fibre by this subtle matter: is it possible then that this movement can delineate an object, or paint the colours of it, can it make the internal parts of the surface of the brain like the surface of those bodies which struck the sight? this can happen but by two ways, either the animal spirits charged with the colours of the objects, must be applied successively in the proportion of a drawing on some parts of the brain, or they must by their motion alter the substance of the brain, change the combination of its parts, form new surfaces, colour them by a mixture of the different parts of the blood, so that they might represent the figure of the object perceived: both the one and the other is impossible, the animal spirits are not susceptible of different colours, they are a pure fluid which changes its nature by the mixture of any foreign bodies, besides, the subtle matter which causes their reflux towards the brain,

stops

stops at the surface of the fibre which contains them, and acts on them only by compressing this fibre; this matter cannot mix with the spirits contained in the nervous fibre, it cannot then colour the animal spirits, supposing even it was coloured itself.

These spirits entirely fill the tube in which they return back, and escape from this tube in a right line; this movement cannot incline them to apply themselves differently to a surface to draw there the design of an object, and colour it according to its different shades.

There is yet less probability that these spirits repelled from the bottom of the eye can alter the disposition of the parts of the brain, and form there new surfaces; the substance of the brain is not susceptible of all these changes, and was it susceptible of them, a movement in a straight line could not effect them: compress for instance the extremity of a pipe filled with water, let the compression, or the figure of the compressing body be what it will, you will force out of the other extremity, always a part of the water it contained, which will escape by a straight line incapable of forming any determinate figure, or the least resemblance

blance of the compressing body. External objects then cannot delineate on the brain the picture of any object which is present to our eyes. This operation is useless to the human soul, which is entirely incorporeal and cannot be affected but by a supernatural law, therefore has no occasion for any picture on the brain, to conceive an idea of objects; besides, if it was necessary for the images of objects to be delineated on the substance of the brain at the time the soul perceives them, our memory could never represent them to it, since nothing could when the object was removed, restore to the animal spirits scattered over the brain, those combined colours and movements which were necessary to delineate the surfaces of bodies. Whereas in attaching the idea to the movement of the fibres alone, it is easy to comprehend, that the agitation alone of the animal spirits in the brain, is sufficient to awaken ideas there.

But supposing madam, that external objects delineate a likeness on the brain of the mother, supposing still, against all probability, that the animal spirits, which have delineated this likeness, are transported with the same modifications they received in the organs of sensation of the
 mother

mother unto the brain of the infant, that they can delineate and paint there the object perceived by the mother, it does not hence result that they can delineate the same object on the external parts of the child, because the whole power of the soul cannot give a motion to any part of the animal spirits, to determine them to the skin rather than any other part: nothing is subject to its influence, except the parts destined for motion. But if the spirits were transported there, they could not arrive in the same order in which they were repelled towards the brain, they here meet with a disposition of the parts entirely different from that of the brain; from this moment the whole mechanism is overthrown, and the concurrence of circumstances which was able to produce in the brain the first effect, can never be found on the surface of the body.

But yet once more madam, should there exist a communication of ideas betwixt the mother and infant, should an idea be excited by a coloured image of the object delineated in the brain, since in consequence of this idea the external parts of the mother do not receive any impression which changes their texture,

texture, and represents the object of this idea, the figure of this same object cannot be delineated on the body of the infant, in consequence of the idea which has been communicated to it: in vain is the difference alledged between the texture and strength of the one and the other. The same weakness which is met with in the external parts of the infant's body, is found in its brain also, its sensations are proportioned to this weakness, as they are in the mother to the strength and elasticity of the fibres of her brain. The passions and all the different movements they can occasion, must be then in both mother and infant, proportioned to their different degrees of solidity, that which the passions cannot effect in the mother by reason of the resistance of her fibres, they cannot effect on the external parts of the infant, because the resistance of its fibres, tho' small, is in proportion to the action of its mind.

I am &c.

L E T-

L E T T E R VIII.

The force of imagination in the mother, can neither add new parts to the infant in the womb, destroy those already formed, nor change them into those of any other animal.

YOU ask madam, if the imagination of the mother can add new parts to the infant, efface and destroy those already formed, or transform the parts of the child into those of any other living creature? The examination of these questions is the more necessary as they make part of the prejudice which I have undertaken to refute. It is said, that the mother's being frightened at the sight of the claw of a Lobster is the reason of an infant's being born wanting some of its fingers, that the meeting a maimed person is the cause of an infant's being born without an hand; by having heard speak of a monster with many heads, the imagination of the mother has occasioned another head to grow on the neck of the child; in short the unexpected meeting of an animal which has surprized and frightened
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the pregnant woman, has occasioned the child to resemble that animal.

I might repeat here every thing which I have already said on the impossibility of a communication of ideas between the mother and infant, and thus decide the argument against the force of imagination; but I purpose following another method. Suppose the imagination of the mother can mark the infant with the resemblance of what particularly affected her, its power must be consequently confined to represent those objects only of which she can have an idea: I observed in the preceding letter, that the mother can have a knowledge of the external surfaces of objects only, that she neither has nor can have any knowledge of their internal structure, their connexions, nor proportions. The parts added to the body of the infant have an internal arrangement which the mother cannot be acquainted with. Can the imagination of the mother then produce that which she is ignorant of, which never struck her fancy, and which she cannot have any idea of? This is certainly impossible. These parts are organized, have a form and internal disposition of parts like the other parts of the infant; they must then have the

the same origin. The mother who cannot by the force of her imagination create an infant, cannot by the same effort create the least part of one : but can she efface and destroy those parts which are already formed ? If the mother could by the force of imagination destroy a part of an infant, she could by the same effort of her imagination destroy an whole infant. Were this the case how efficacious then would remorse and shame be to preserve female honour.

Be not surprized madam, that they are unable to do this ; in spite of all their violence, a part of the body cannot be destroyed but by a want of nourishment, then it languishes, dries up and is effaced ; for the imagination of the mother to be able to effect this privation of nourishment, the distribution of this nourishment must be under the jurisdiction of the soul. I have demonstrated that nutrition is performed independant of the soul, that it is not at all subservient to the imagination ; supposing then, contrary to experience, that the soul of the mother could direct at its pleasure the movements of the infant, to whatever degree of vivacity the imagination of the mother might be carried, yet she could never deprive any one part of the infant in her

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womb

womb of its nourishment. Whatever object struck her imagination, yet all the parts of the child's body would grow equally, if they were equally disposed to it; as to the metamorphosis of the parts of an infant into those of another animal, if it is true that there are some examples of it, yet it can never be owing to the effect of the force of imagination. To effect this change, parts which exist must be destroyed; you see the force of imagination has not this power; parts must be substituted which the mother neither knows nor can have any knowledge of; she cannot represent that which she is ignorant of. Every animal supposes a created and impregnated germ, the creation and impregnation of this, cannot be the effect of the force of imagination. Weigh these reasons madam, with those I have already had the honour of mentioning to you on the impossibility of the mother's communicating to the infant in her womb her ideas, her fears, or her desires, or putting in motion at her will, the blood of the infant and its component particles, and I hope you will not then have the least doubt of the absurdity of this prejudice.

I am, &c.

L E T-

L E T T E R IX.

Whether the imagination in pregnant women acts on the infant by a kind of sympathy.

I KNOW madam, the justness of your way of thinking, and have always entertained hopes of convincing you that the force of imagination in pregnant women was an ill founded prejudice; if you have hitherto entertained a favourable opinion of it, 'tis for want of having sufficiently examined it.

Your sex possess such excellent understandings that when they have the least glimpse of the truth, there is no prejudice which they will not readily give up.

Every body is not equally open to conviction, and you will meet with some people who in spite of the reasons I have alledged, will say they do not know in what manner the force of imagination operates, but perhaps it may be by a kind of sympathy. The word sympathy is a vague term, I will endeavour to explain the meaning of it.

Sympathy between mankind must be considered either in the object which excites the sympathy, or in the person

who experiences its power: in the object it is a disposition of the parts capable of exciting in the mind a lively agreeable sensation. In the person affected by it, it consists in a rapid movement which inclines us towards the object which has excited in us this agreeable impression, and which is become the sole end of our desires, and affection. I have endeavoured madam, to give you an idea of the source of this sympathy, by comparing the impression made by external objects on the mind, to the concords formed by an harpsichord. The shape, the features, the looks of a person strike us agreeably at first sight, whatever effect it has produced in us, we cannot have seen the person by any other mechanism than that by which we perceive other objects, that is by the impressions begun at the bottom of the eye, and terminated by the motion of the fibres of the brain. This motion has inspired us with the combined idea of many good qualities in which we hope to find advantage and pleasure, powerful motives to animate our love, and make us eagerly pursue this object. Consult those who have experienced what they call sympathy, ask them by what power they have been so violently hurried away, they

they have perceived in one person at first sight an air of sweetness, of goodnature, of complaisance : in another marks of spirit, jollity and vivacity ; thus they give you an account of what they perceived instantaneously, and tell you what tones the harmony is formed of.

It is evident that the force of imagination cannot act on the infant by this kind of sympathy, and its effect, if it had any, must terminate in inspiring either love or hatred in the infant. I can perceive no operation which could mark objects on the infant's body.

But as terms may be abused, and sympathy between different inanimate bodies, be called a kind of conformity and affinity in the disposition of their parts, in consequence of which they attract one another and easily unite ; if the force of imagination is attributed to this kind of sympathy, some parts of the infant's body must be supposed to be disposed in such a manner as to attract the animal spirits which excited the idea, without their losing the movement which external objects caused in them. This supposition is absurd, but if the same movement of the animal spirits, could subsist after their passage thro' the whole mass of blood,

this would be no other than a movement in a strait line, destined for the vibration of a nervous fibre only. It delineates no image in the brain, and if it could delineate an image in the brain, still it could not produce the same effect on the skin, on account of the difference between the substance of the brain and the skin. And lastly, tho' all these effects were possible, to decide them, we must suppose in some one of the parts of the child a disposition independant of the mother's imagination. The marks then which appear on the skin of the child, cannot be attributed to the force of imagination.

Such madam, is the mechanism of the force of imagination, not a single proof is to be found in its favour, on the contrary, every thing concurs to prove it groundless; I therefore conclude once more, that the force of imagination of the mother cannot mark the child in her womb, with those things she longs for, or which particularly strike her imagination.

I am, &c.

L E T-

L E T T E R X.

The cause of those strange accidents which are attributed to the force of imagination, the analogy between the animal and vegetable creation, both spring from a seed which contains all their parts in miniature.

I Mentioned to you madam, in one of my former letters, that those strange accidents which are absurdly ascribed to the force of imagination, are almost always the consequences of the mechanism, which fecundates the egg, and that the laws of this mechanism were analogous in both the animal and vegetable system; if this analogy is as true and constant as I imagine it, if every egg is fecundated, is nourished and receives its growth according to the laws of this same mechanism, the same accidents and oddities will be met with in both, and then since there is but one same principle to explain the fecundation and growth of both animals and plants, there can be but one method of explaining the accidents which happen in their fecundation and growth. Every thing is simple and purely mecha-

nical. Let us therefore hasten to an enquiry which promises the discovery of truth.

These oaks, these limes which form your park, your shrubs, your herbs, in short all kind of plants have been inclosed in their seed; this verdure which is renewed every spring, the flowers which in this agreeable season decorate your fields, and amuse your sight, the fruits which in your orchard succeed the blossoms, are all a successive unfolding only of those parts which were contained in the seed; they existed therein in miniature, and were prest together one on the other.

To what a variety would the productions of nature have been subject, if every species of trees and plants had not been constantly determined by a first organisation, could it have been ever certain that an oak would produce an oak, if the oak which should spring up had not been contained in miniature in the acorn, if there had not been a collection of solid parts which by developing themselves in a regular and uniform manner, would form the shape of an oak.

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To deliver up the propagation of any species of trees or plants to the chance meeting of certain bodies, would be to expose them to degenerate incessantly, and totally at length to change their species. It is then indispensably necessary for the formation of every organized body, that is to say of every body which preserves a constant regular form different from every other body, to have a bud which contains all its parts in it. This consequence extends to every living creature, as well as vegetables. Vegetables spring from seed, animals from eggs. The productions which are always before our eyes may serve to decide those which escape our sight. The simplicity of nature is become the rule of the principles of physics. A great number of animals spring from eggs, this gives us reason to think that viviparous animals are also in their first origin inclosed in some substance, which we call an egg. The difference of external appearances makes no difference in the fundamental principle, all kinds of seeds have not the same shape, no more are all kinds of eggs alike, it is enough if the seeds and eggs, forgive me the expression, contain the first architecture of the plant or animal, this is the
essential

essential point, 'tis in this they resemble each other, 'tis by this means common to both, that every species supports itself, 'tis by this method alone they could possibly be kept up, there is therefore at the bottom no essential difference between them.

Such madam, are the first lines of resemblance between the animal and vegetable creation, if you comprehend them you will find but little difficulty in comprehending the sequel of this analogy.

I am, &c.

L E T T E R XI.

*Whether insects and mosses are bred from seed.
The mechanism of their fecundation.*

MADAM,

THE generation of insects is no objection to what I have advanced, tho' they are bred in muddy waters yet they are not produced there by chance, nor the corruption of the particles of the water. These places are proper to hatch and nourish them, if I may use the expression, in their earliest infancy, but they

they spring from eggs like every other animal, there existing a first seed which contained the whole insect in miniature, fixed it's genus and species, in an invariable manner. These insects formerly so little known, and on that account so greatly despised, are divided into a prodigious number of species, every species has its particular shape, its distinguishing characteristics, both constant and invariable, and consequently dependant on their first seed. Regard then no longer madam, this crowd of insects as a vile mass of corruption, thanks to an attentive, clear sighted, judicious and indefatigable philosopher; they are a new world, an innumerable people who have their own manners, laws and customs, and are to us like new riches scattered over the universe. *+ Swammerdam.*

The naked eye, or the eye assisted by the microscope can perceive this external organization which distinguishes insects from one another. If the interior organization escapes our sight, reason supplies it. It judges of the diversity of their viscera by the variety of their aliment, one species armed with a trunk seeks its nourishment from the juice of flowers; another eats the leaves of trees,
a third

a third lives on the rind of oranges and lemons. It would be endless to give you a detail of the nourishment of insects: every one has its own, every one then must have an essential difference in the state of it's viscera.

What might I not say on the organization of their brain? What a variety might not one suppose observing in every species of insects, their particular inclinations, labours, and policy. Determined by a singular organization, they have always the same ideas, the same views and the same propensities. The examples of different species produce no alteration in any other. The Gnat never imitates the Bee, in short every one is confined to it's own order, and as they cannot be supposed to have the use of reason, they must certainly be guided by a peculiar organization; that this organization might subsist always the same, it was necessary that, like other animals, insects should spring from a seed which contains their whole parts in miniature.

It is the same with those mosses which grow on the bark of trees or in wet places, you ought not madam, to look on them as the effect of transpiration, consult the botanists, and they will acquaint

quaint you that they are real plants, the microscope discovers them sufficiently to know them, and to distinguish them one from the other, as we distinguish the elm from the lime. They will tell you also that like fern, their leaves are covered with a light dust, which is a true seed. The wind carries it away and deposits it in wet places, 'tis from this seed all mosses owe their birth. Thus madam, I have given you a different idea of mosses, and shewn you that even insects are not to be despised.

Having reconciled you to insects, give me leave to observe that there are some which might amuse your leisure hours, excite and satisfy your curiosity, and agreeably multiply your country amusements; these cannot be too much varied, the eye and mind grow languid with uniformity, a parterre would be soon tiresome if it was not adorned with different flowers; I would fain mix the same variety in my letters.

We have seen every thing which vegetates, every thing which breathes inclosed without life, without action, in a very small space, in a seed, every thing exists there, tho' nothing appears distinguishable. Let us animate these beings, impregnate

pregnate these seeds and eggs, cover the fields with plants and trees, people the air, the earth and the water. We can easily do this, the business is only to make a liquid pass into the seed which raising lightly the partitions of it, facilitates the entrance of a thicker juice, which encreasing every day the first dilatation, nourishes and causes all these beings to grow.

'Tis in this alone madam, that the whole mechanism of the impregnation of seeds consists, they contain the entire plant or animal, but the parts of these different bodies are so closely pressed together that they cannot in this state afford entrance to a sufficient quantity of liquid, or to a fluid active enough to stretch them and unfold them entirely, they must be previously disposed thereto. It is necessary (to use the expression,) to give a little light between the partitions, and in the canals of these minute vessels, it is necessary that a very small wedge should facilitate the entrance of a larger wedge. This first effort is what is meant by fecundation, a very thin fluid insinuates itself, penetrates the vessels destined to form the woody fibres, the leaves, the flowers, and in short the whole tree. Then the
seed,

seed, disposed by this first dilatation to receive thicker juices, and capable of a greater effort, unfolds itself by degrees, and at last arrives at the proper growth of its species.

I have pursued this account in plants only, it is easy for you to apply what has been said to the eggs of animals, they contain in miniature the whole animal, in like manner as the seed contains the plant; in the one and the other, you meet with the same minuteness, the same assemblage, the same pressure of the parts together, consequently the same obstacles to the entrance of the nutritious juice. In such an exact resemblance, the method must be the same. The impregnation of the egg then, like that of the seed, must be effected by a very subtle fluid, which separates the compressed tubes, and affords entrance for a thicker and more copious juice, on which depends the nourishment and growth of the animal; thus nature which, preserving an exact simplicity, employs one same means only to maintain the different characteristics of plants, trees and animals, employs also but one same mechanism for the rendering fruitful the seeds of both.

I am &c.

L E T-

L E T T E R XII.

The soul does not free the human body from the mechanical laws of impregnation, analogous in both the vegetable and animal creation.

MADAM,

I AGREE with you, there is a great difference betwixt animals and plants, and I confess that to examine things by their surface only, the comparison appears exceptionable. It appears more so when this analogy is extended to the human species, the excellence of the soul and the superiority it gives mankind over the rest of the universe, gives room to think there must be some particular laws for them, different from those of other animals, but the soul does not free our bodies from the mechanical laws given to man, to regulate and direct his independant actions; it has no share in his necessary actions, we can pursue or avoid an object, but we cannot interrupt the circulation of our blood, it is subservient to a mechanism which subsists independant of our will. It is the same with the distribution of nourishment, is there

there any person, as I have observed before, who can at his pleasure alone, prevent one of his hands from receiving nourishment, or augment in it the quantity of nutritious juice : it is then certain that the mechanical laws subsist in us independent of our soul, and in this sense it is true that plants, trees and animals, as well as mankind, are subservient to the same laws.

These reasons when applied to the impregnation of the egg, acquire if possible fresh force ; the egg which before impregnation is inclosed in the mother's belly has certainly no soul, and the body inclosed in the egg must be unfolded and take a determinate shape before a soul can be united to it. Its destination cannot change the means necessary for its impregnation, it must be previously disposed to receive a nourishment capable of making it grow. The pressure of this minute body opposes the entrance of this nourishment. It must then first of all be lightly raised up, which is effected by a more subtle fluid than the nutritious juice, a liquid fluid enough to insinuate itself into the vessels which are so closely pressed together, and active enough to unfold them by degrees. This is a necessary

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cessary mechanism, seeds and eggs are exactly in the same condition, and have occasion for the same assistance.

It is true madam, that the liquids which operate on seeds and eggs, the first unfolding of their parts, are different from one another, but this difference does not destroy the equality of the mechanism. The juice of some plants is a poison, others contain a sweet agreeable liquor. Why have these two species of plants growing on the same soil opposite qualities? 'Tis because one of them is disposed to receive a nourishment loaded with salts capable of thickening our blood, or corroding the solid parts of the body, whilst the other by the disposition of the pores of its roots refuses entrance to these salts, and admits no other nourishment than pure and balsamic juices.

The seeds of plants you know madam, are plants in miniature, if a plant is designed by its structure to imbibe from the earth poisonous juices, this same structure must be met with in the seed of it? How must impregnation operate on this seed? I have several times repeated, that a fluid must insinuate itself into the vessels which are closely shut up and
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prest together, and dilate them, to facilitate the entrance of a more viscid nutritious juice, but we have supposed, and in fact it is true that this plant by its structure admits none but poisonous juices, consequently the liquid which impregnates the seed must partake of the nature of these juices which are hereafter to afford it nourishment. Without doubt it is so, and from this moment you may discover the infinite variety which is to be met with in the liquids destined to fecundate the seeds of plants and trees, but this variety however great it may be, can never change the laws of the mechanism. The seed must always be penetrated by a subtle fluid, that the vessels may be raised up and unfolded; every thing which has been said of seeds may be applied to the generation of animals, they are designed to be sure, to be nourished in a very different manner from plants, they must be predisposed to this nourishment, by the action of a fluid which is entirely homogenous. But this difference of the liquids has no concern with the mechanism of impregnation. There can result no change from the body of this animal being designed to receive a soul: Nutrition is independant of the soul, and impreg-

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nation which is only the prelude of nutrition, can be no more; especially since the seed, the object of impregnation, has no soul, nor can have one. The impregnation of all kinds of seeds and eggs, is subservient, then, madam, to one same mechanism alone.

I am &c.

L E T T E R XIII.

The irregularity in the shapes of infants, depends on their situation in the mother's womb. The effects of compression.

MADAM,

SINCE you are now convinced of the necessity of a seed, and an uniformity in the mechanism of impregnation, it remains to explain to you that the cause of those strange accidents which happen to children in the womb, and are attributed to the force of imagination in the mother, happen equally to plants, and trees, and that they have in both the animal and vegetable creation, one common source in the mechanism of impregnation. I am not surprized that you expect this with impatience, nevertheless
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since every irregularity we observe in the shape of animals and vegetables does not depend on their impregnation, since some are occasioned by uncommon circumstances, I shall first examine these particular accidents, and thereby our account of the others, will become infinitely more simple and easy to be understood.

The gardener and principally the florist, separates with care from the mould, stones and other hard bodies which are mixed with it, for want of this precaution, he runs a risk of the plants being incommoded by the vicinity of some of these hard bodies, which would occasion it to give way, would press forcibly on the stem, flatten it, and give it an irregular shape; it is the same with the human body, that the infant may keep a regular shape, the egg must unfold its parts in an open space, but it sometimes happens that the curvature of the back bone, or the bones of the pelvis, tumours in the internal parts, and many other obstacles, straiten or fill up the space destined for the infant, and compress and incommode different parts of it. This is the cause of many irregularities in the shape of children. Sometimes the spine of the back is curved in

different senses, sometimes the infants arms are thrust back and crost behind the back ; sometimes a child is born with the arms stretched out in the shape of a cross and the head bent downwards, in short the body of the child like a fruit new formed and left to grow in a mould which confines it, takes as many different shapes and attitudes as you can imagine differences in the manner in which it is comprest.

The hands of the child may also compress and divide other parts of its body. A finger laid on the lip, presses too much on one particular part of it. This compression straitens the vessels and hinders the part from receiving its nourishment, this part too fine and too weak in proportion to the lateral parts which receive their whole proportion of nourishment, tears with the least force : the lip is in consequence thereof divided and receives the appellation of an hare lip. The same accident happens every day to the roots of plants whilst in their tender state, they grow too near some hard bodies, as stones, &c.

If you attend madam, only to the degree of force necessary to divide with any instrument the lip of a new born child, you will have room to doubt that the

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the pressure of one of its fingers could cause a division of it whilst in its mother's womb, but recollect that a bit of silk which ties a branch of a young tree, becoming superior to the whole force of the sap, hinders its growth, or occasions a division of the bark and woody fibres; this superiority of force which we acknowledge in liquids, whose impulse is the cause of growth in both animals and vegetables, consists chiefly in the continuance of its action, but this action considered in every instant is so weak that the least obstacle can surmount it. Apply this principle to a new formed child whose flesh has hardly any consistence, and the action of whose fluids is proportioned to this imbecillity, and you will be convinced with how much ease the lip of an infant may be divided by a continual pressure made on the part by one of its fingers, the hardness and resistance of which is greatly superior to the lip.

But do you think it possible madam, that the body of a child can compress the body of another child so strongly as to cause it to perish. These accidents are rare, but we are not without instances of them. A woman happily brought to bed of a well shaped child, was at the same

time delivered of a little embryo extremely flattened, and of no more than two thumbs length. Its flesh appeared like a membrane, but the head, the body and the extremities could be easily distinguished. If the whole body of a child can be exposed to such an excessive compression, we cannot refuse admitting the possibility of a much lighter one, and since such a compression occasions in plants the same accidents which we observe in animals, we ought to have recourse to the same cause only, to explain the same facts.

Another effect of compression is frequently seen in plants, those which are straitened for room at their first coming out of the ground, are bent and twisted in different manners, in like manner the soft parts of a child may be disfigured at the time of its birth; its forehead may be flattened, and the face deformed. Thro' these irregularities, people sometimes fancy a resemblance of some particular animal, but whatever propensity credulous spectators may have to attribute these effects, and this likeness to the force of imagination in the mother, they are as much independant of it, as if the
midwife.

midwife had disfigured the face of the child with her own hands.

It is easy to quote a great many instances of different kinds of irregularities caused by the compression of the infant's body in its mother's womb, or at the time of its birth, and to convince you the better of what this compression is capable of doing, I might recal to your memory the effects which whalebone stays, collars, &c. produce in children after their birth, but instead of taking up your attention with unnecessary particulars, I shall go on to another effect of compression, instances of which are constantly before your eyes.

In passing thro' the walks of your park, and especially the rows of elms, you have taken notice that many trees are united together, one kind of these tho' separately impregnated in the earth, on coming up make but one trunk, one same bark incloses them, they separate afterwards towards the middle of the trunk, and form two different tops, sometimes the two trees grow together only towards the middle of the trunk, and make no more than one top, sometimes they are united together by some of their branches only. This oddity is so common in some species
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of trees that we often see many trees unite and interweave their branches together; in all these cases the too great proximity causes a compression in those parts of the tree which mutually touch each other, this compression is consequently augmented in proportion to the growth of the trees, and straitens more and more the passage of the sap in the compressed parts. The bark being too much squeezed and not able to extend itself in proportion to the neighbouring parts which are entirely at liberty, tears and makes an opening betwixt the two trees, and as this slit is made in the place where the two trees touch one another, it happens that the torn parts of the bark unite together by the prolongation and interweaving of their fibres, and form but one same covering; what has been said of the bark takes place also in the fibres of the wood itself when they are exposed to the same compression.

It is the same in children, the fingers or toes being pressed too near each other, grow together like a goose's foot; this union which can take place in other parts of the same body, happens sometimes betwixt two different bodies, and as it depends on the manner in which
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the two eggs are placed in the mother's womb (a position which necessarily varies) this union is made in different ways; there are instances of children growing together by the shoulders, the forehead, the breast, the back, &c. and in all these cases, there is but one same cause, and it is easy for you madam, to explain it, by applying what I have said on the subject of the reunion of trees.

Whole bodies do not always unite together, we sometimes see two heads on the same body, and sometimes two bodies with but one head, I have myself seen a child with four arms, I believe you are very well persuaded that the force of imagination in the mother could not create this head or these superfluous arms, and knowing that two trees when too near each other will unite together and grow together, you will find out the cause of this reunion of parts without trouble; but why have these parts only, taken their proper growth? Have they belonged to another body, and if they have, why has not the whole body been united together with the other.

The answer to these questions depends on the principles of impregnation analogous in both the animal and vegetable creation.

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creation. I shall have the honour of acquainting you with them in my next letter, and hope you will receive satisfaction from the simplicity of these principles.

I am &c.

L E T T E R XIV.

A proper disposition of the fluids and solids, requisite for a perfect impregnation. Accidents depending on a too great resistance of the seed. Monsters formed by the want of, or addition of some parts. Of some kinds of false conceptions.

MADAM,

I LIKE the eagerness you express to receive a satisfactory answer to your questions concerning the body to which the head and arms added to the other child must have belonged. You shall judge of this case yourself, 'tis on the following principle you may found your decision, I have mentioned to you that every plant and every animal has been inclosed in a first seed, that this seed must be impregnated before it can receive any nourishment

ment or growth, and lastly, that this impregnation consists in a slight unfolding of the solid parts of the seed, effected by the action of a fluid which insinuates itself even into the minutest vessels. Hence you will readily conclude that this fluid must possess a force capable of raising these vessels, that its impulse must be superior to the resistance opposed to it by the solid parts of the seed. But it may happen either that these vessels make too great a resistance, or that they yield too much to the action of this fluid. I shall now consider the result of these two different cases.

If the whole seed makes too great a resistance the fluid cannot penetrate it, the parts of the seed will not be unfolded, the passage will not be open for the nutritious juice, and the seed will not be impregnated at all; or it may happen that this too great resistance is met with in only a particular part of the seed, and that the other parts yield to the action of the fluid. Then those parts which have not made too great a resistance will be impregnated, and on the contrary those which by reason of their too great resistance have denied entrance to the fluid, will remain unimpregnated. The im-
pregnated

pregnated parts receive their nourishment and growth, whilst the unimpregnated part entirely wastes away. 'Tis thus madam, children are born without arms, or without a head. The mother's imagination has not destroyed these parts, but they were never impregnated.

Sometimes the greatest part of the seed makes too great a resistance to the impregnating fluid, and one particular part only, the head for instance, which yields to the impulse of this fluid, is impregnated, without doubt you will be before hand with me in determining why of a whole body, the head or the arms are the only parts which have been impregnated, and joined to the body of another child. You are already acquainted that this reunion is caused by the too great proximity of the two eggs in the mother's womb. Every union between two bodies depends on this cause, you can now by the help of these two principles account for every kind of monsters.

But you will ask no doubt madam, why there never happens a birth of a single arm, or head alone, since it might happen that one of these parts of the body only might be impregnated. The
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reason is very simple; an head separated from the body cannot receive any nourishment. The nourishment passes from the mother to the child, thro' a vascular chord called the umbilical chord, which penetrating the child's navel carries the blood from the mother into the other vessels which distribute it to all the parts of the child; there is no other way by which the child can receive nourishment, so that when the trunk of the body does not exist, the other parts tho' impregnated cannot receive their nourishment and growth, unless the proximity of another body affords them an opportunity of uniting themselves to it, and if they receive no nourishment, in vain have they been impregnated, they waste away and disappear entirely.

It is not thus when the impregnation is confined to the vascular chord and membranes destined to wrap up the infant's body, and you may safely conclude that tho' every other part of the seed intended to form the infant's body was unimpregnated, yet the membranes and umbilical vascular chord which exist in the seed, may have been impregnated, and then they are nourished and increase in size independant of the infant's body, because they receive the blood by their particular
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and external branches, but as they are not separated, raised and supported, by any other body, they give way, bend, and uniting together form an ill shapen mass. I have even observed in one instance, that the membranes which serve to inclose the child, having been unequally impregnated, the lymphatic vessels seemed to have had the greatest share of impregnation, and were so prodigiously large and so numerous that at the time of her lying in, the woman was delivered of a prodigious mass of small vesicles attached to one another, and full of a fluid resembling lymph.

This accident is not attributed to the force of imagination, I might therefore have past it over in silence, but its connexion with the principles I have established shows the extent of them. 'Tis a further proof in their favour, and in a case where prejudice is so deeply rooted, I am of opinion madam, that I ought not to neglect the least circumstance which tends to overthrow it.

I am madam, &c.

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L E T T E R XV.

The impregnation of seeds, defective through the too great resistance of the parts of the seed. The consequence of this defect in trees. Its application to the infant. Deformities of the face. Defect of growth in some parts. Of some kinds of marks and blemishes.

C O N T R A R Y to your opinion madam, it is not impossible to find in vegetables, those defects which we observe in the impregnation of eggs. It is true, that vegetables not being constantly inclined to the same external shape, the same-order, and the same number of parts, the suppression of a branch is not so easily perceived as the loss of an arm in the child. Yet this defect does not always escape the sight of the skilful and attentive gardener; he discovers it chiefly in young trees; he observes, that instead of two branches which should form the fork, there is often but one only, which keeping the inflexion by which the two branches should separate from one another, shows plainly that another branch is wanting to match it;

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and what puts this beyond all manner of doubt, a little obtuse elevation is observed in the part where the remaining branch begins to spread itself out. This case exactly resembles that of an infant born without an head, or without arms, and is an instance that every part of the seed has not been impregnated.

As to the defect of impregnation in the whole seed, it is too common to admit of the least doubt; every body knows that, of a quantity of seed sown in the earth, a part only springs up; it is not probable that this happens from a want of the impregnating fluid, because the neighbouring seeds have been impregnated by it; besides, the husk which covers the seed has been half opened, the farinaceous pulp which wraps up the bud has been penetrated, but the action of the fluid has been confined to this only; it could not insinuate itself into the bud, and therefore could not impregnate it; these traces of uniformity alone, are convincing proofs that the mother's imagination can have no share in producing those monstrous births, which arise from a want of some particular parts: however, I further add madam, that there must be a medium between the entire resistance, which hinders
impregnation,

impregnation, and this limited suppleness, which allowing the entrance of the impregnating fluid, concurs to a perfect impregnation. The solids may not entirely resist it, and yet not have sufficient suppleness; then the vessels will not be sufficiently unfolded, and will not afford entrance to a sufficient quantity of nourishment, nor to a nourishment sufficiently active. The bud will be nourished, but not equally with another bud, which has been perfectly impregnated; it will grow, but will never attain its proper size: instances of this sort are frequent in shrubs of the same age, which have been sown and have sprung up in the same earth; some acquire in a short time their natural growth, while others, tho' often regular in their shape, as far as their diminutiveness will admit of, remain in the state of dwarfs. I presume madam, you foresee the application I might make of this circumstance, and at the same time conceive why a branch of a tree, an arm of a child, or any other part does not grow in proportion with the rest; 'tis because this branch, or this arm receives a less quantity of nourishment, on account of the first solids being not sufficiently supple in the impregnation of the seed,

and not being sufficiently raised to receive a quantity of nourishment proportionable to the other parts.

In these half impregnated branches, all the woody fibres do not encrease equally, there are some which, obedient to the action of the sap, dilate and lengthen themselves, others, which do not grow in the same proportion, resist this common extension, and by their resistance make the branch crooked. 'Tis in the same manner that an infant, which appeared well shaped at first, grows crooked; a portion of the vertebra of the back, and the ligaments which unite them together, not being able to grow in proportion with the rest of the body, forces the spire of the back to bend itself and form an arch.

The same mechanism may occasion deformities in many other parts of the body. If the nostrils are incapable of acquiring their full extent, the nose will be pinched in and crooked; this will be called the nose of a Monkey, or the beak of a bird, according as the shape more or less resembles the one or the other, or some event thought of too late, or the caprice of the spectators shall please to decide. One of the eyes may be taken for the eye of

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an animal; if the eyelid, or if the bones which form the anterior part of the orbit of the eye, less extended and less open than those of the other eye, discover the sight of the eye alone: there can be no occasion to relate all the different forms which the other features of the face may take, according as the skin and muscles are more or less shortened, and the bones more or less elevated or depressed. It is sufficient for you to be acquainted with the cause of them, and to perceive that these varieties, like those which happen in plants, ought not to be attributed to the force of Imagination, but depend on the inequality alone of impregnation in the plant or animal; we shall now consider some other effects of the same mechanism:

The skin which covers our body, is not madam, a distinct part from the others, since it is enclosed in the seed, and is subservient to the same laws with the other parts; that it may be wide enough and sufficiently flexible in every part, it must be equally impregnated in every part; this does not always happen: when it does not give way sufficiently to the growth of the parts which it covers, it incommodes them, forces them to bend, and sometimes

binds them like a ligature, and hinders their growth. This defect is chiefly perceivable in some persons, who have several fingers of a natural size as far as the second articulation, where they are all of a sudden contracted, and so small, that one might mistake the extremity, for the finger of a child grafted on (to use the expression) the finger of a grown person. The like accidents, though less frequent, happen in the arms and legs, almost always by the defect only of the impregnation of some part of the skin, and never on account of the mother's having seen a maimed person.

These accidents are not always so considerable; frequently they happen in very small parts, and the resistance the fibres make to an extension, in equal proportion with other parts, discovers itself by a change of the texture and colour of the skin only, which becomes more compact, and resembles in colour the cicatrice of a wound; this is sometimes perceivable in only two or three fibres united together, and sometimes in a greater number, the points of which form a circle, a square, or some other whimsical figure: here is sufficient variety to find out the shape of animals, flowers or any other known

known object, as caprice may dictate; here is a fruitful source of likenesses with objects, which may have struck the mother's imagination, there wants no more than to determine what objects have affected her; a nine months pregnancy will afford a sufficient quantity to pick out some one which this mark has some resemblance with.

We discover every day in the roots and wood of many trees, resemblances with known objects, much more strongly characterized than those which we fancy we observe in children; they are even more perfect, because the solidity of their parts prevents their changing, and varying their shape so much: when speaking of the change of shape, I do not mean those changes which the motion of the part produces, I mean a real change, which the different ages bring on; a slight impression on the skin, which in infancy resembles a small cicatrix, acquiring a greater extent in proportion to the growth of the rest of the body, assumes the shape of a fish, or some other object; a new change of the skin, varies its figure and likeness, and at last the skin wrinkles, shrivels up, the cicatrix closes, and resembles nothing at all. Resemblances so connected with the changes

After pale observed in Fossils, Gems, Stones, &c.

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which happen to our bodies, discover plainly their origin.

I am, &c.

L E T T E R X V I .

The effects of too weak a resistance in the parts of the seed. A resemblance with draperies and the red fruits.

MADAM,

HAVING seen what must be the consequence of a too firm resistance in the parts of the seed, we shall now examine the result of a too little resistance: if the bud of the plant yields too much to the action of the fluid, which disposes them to receive nourishment, these over dilated vessels will imbibe gross and redundant juices, which will cause the plant to grow in an extraordinary manner; you see frequent instances of it, tho' perhaps you never took particular notice of them: recollect the difference which is met with betwixt a plant raised in the common earth, and a plant of the same kind raised in an hot bed; this last is much larger, stronger, and better nourished than the other: the
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reason is because the juices of the hot bed possess a much greater activity than the common juices of the earth, and consequently make an effort so much the greater in the impregnation of the plant, and are more proper to surmount the resistance of the bud, dilate the vessels more, and dispose them to receive a greater quantity of nutritious juice.

The same thing happens to flowers which are raised in vessels filled with water, and placed in winter time on chimney pieces; the salt petre which is mixed with the water, increases its action, and sometimes to such a degree that the plant becomes of an excessive size. The whole seed of the animal may also resist too weakly the action of the impregnating fluid, whence like a plant raised on an hot bed, it would receive too strong and too plentiful a nourishment, to contain itself within the limits of its natural size, and would grow to an excess.

I cannot forbear madam, to remind you here of the uniformity which is met with in the vegetable and animal creation. Over-grown plants and trees put forth nothing but branches and leaves, they bear hardly ever, either fruit or flowers; a certain proof that the vessels are too
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much dilated, and that a coarse sap circulates in the minutest vessels: in such a disordered state it is in vain to expect the separation of a pure, sulphureous juice, capable of insinuating itself into the seeds of flowers. This too great dilatation of the vessels, occasions men of a gigantic size to be almost always weak. The substance of their brain separates imperfectly from the mass of blood, its spirituous parts, a thick serosity passes with the spirits, which not being sufficiently depurated; want a proper activity, and hence the elastic power of the nerves is lessened.

But if the whole bud can yield too much to the impulse of the impregnating fluid, it is plain this defect may also take place in some parts of it also, this consequence the truth of which you have already acknowledged, will unfold the whole mechanism of these draperies, flowers, fruits, and in short of every thing which is ascribed to the force of imagination.

If the whole skin gives way too much to the impulse of the impregnating fluid, the rest of the body keeping a proper resistance, it will receive too great a quantity of nourishment and grow to an
excess,

excess, then not being proportioned to the bulk of the body, it will be forced to fold itself up in many places; these different folds, like those of drapery, lying on it, prejudiced persons think they see a true drapery formed by the force of the mother's imagination. This monstrous growth of the skin gives room for other comparisons; when it is found in that portion of it which covers the head, large enough to form several folds, it has been supposed to be like a mitre, in another form like the Persian tiara; one circular fold only, has been compared to a royal diadem, and people have always imagined, that the sight of some picture has occasioned these likenesses; but why then does not this drapery, this tiara, this mitre, this royal diadem, represent the colours, the shades, and the jewels which the mother saw in the picture? Since it was this mixture of colours and ornaments which affected her imagination, why is the colour of these monstrous excrescences like the rest of the body? 'Tis because a part of the skin has taken too great a quantity of nourishment, the same as some barks of trees, which having received too great a quantity of sap, are dilated,

dilated, folded together, and depart from a level with the rest of the bark.

But it will be alledged madam, that we see other figures, which possess a greater likeness, as currants, mulberries, strawberries, raspberries, &c. and these productions are not only like all these fruits, but moreover they follow the progress of their maturity, they become red in proportion as these fruits ripen. If you will suffer me madam, to acquaint you with some anatomical facts, these resemblances can never impose on you.

The surface of our body is spread over with an infinite number of glands about the size of millet seeds, which are called the miliary glands, they have veins and arteries, which creep over their surface, and are designed to separate from the arterial blood, the serous particles which make the matter of perspiration. This serosity, a great deal thinner than the red part of the blood, passes thro' them with ease. The smallness of the tubes thro' which it flows, will not suffer the red globules of the blood to pass: hence these glands in their natural state, are colourless; for these glands to become red, their tubes must be dilated in such a manner, as to admit a sufficient quantity
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of the red globules, to mix with the ferous fluid separated by these glands. Every one of these glands ought to have been impregnated as well as the other parts of the body, if any of them have resisted too slightly the impulse of the impregnating fluid, they will be more dilated than the others, and grow much larger, so that the texture of the skin which preserves its natural state, not being able to contain them, they will be elevated above it; besides the vessels which should contain only ferous particles, acquire so large a diameter thro' this accidental dilatation, as to allow the red globules of the blood to pass, and thereby the serum contained in the gland receives its red colour.

Now fancy madam, a round gland like a millet seed, composed of several thin transparent membranes, containing a red ferous fluid, and compare it with a currant, the resemblance is sufficiently strong to deceive a person ignorant of, both these miliary glands, and the means by which they are enlarged and become coloured.

Now you are acquainted with the mechanism by which a currant has been formed, you can meet with no difficulty in conceiving how strawberries, mulberries, and raspberries

berries are formed. I have hitherto supposed an enlargement of one single gland only, but suppose an enlargement of many glands united together. This parcel of glands will seem to have some connexion with a strawberry or raspberry, if the dilated glands form a round figure, if an oblong figure, it will be taken for a mulberry. In both the one and the other there is an union of several little glands, which resemble the cells, of which these fruits are composed; 'tis true, they have neither seeds nor stones, because there is nothing in the glands which can resemble those substances, but those who give their opinion on the likeness of fruits marked on the newborn infant, do not examine so closely.

But whence happens the change of colour at the season these fruits ripen? 'tis because at this season of the year the blood is more strongly agitated, exerts a greater force on the containing vessels, and the red globules pass in greater quantity into the internal parts of the glands, and hence this enlargement in size and increase of colour. A fever, violent exercise, great heat, anger, &c. produce the same effect, in the midst of winter. But those, who attribute these marks to the

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the force of Imagination, look upon its effects as mysterious, and expect to meet with a mystery in every thing which accompanies them,

I am, &c.

L E T T E R XVII.

Marks of red wine. The reason why all marks are red or brown.

MADAM,

IT is not owing to forgetfulness, that I have omitted speaking of those marks which resemble red wine; I am of opinion they proceed from a different cause than the dilatation of the miliary glands of the skin: I have reserved this enquiry for the subject of my present letter.

An infinite number of arteries and veins terminate in the skin, their united extremities form there a net work, which is covered by a very thin substance, called the epidermis or scarf skin; in their natural state, these extremities of the blood vessels suffer nothing to pass through them, but the serum of the blood, the red part of the blood continues its circulation through vessels of a larger diameter; the vessels

vessels which form this network may acquire a larger diameter, afford a free passage to the red globules of the blood, become varicous, and consequently cause a varicous elevation on the skin, of a red or dark brown colour, according as the coats of the vessels have lost more or less of their thickness through this dilatation. This accident, which happens sometimes after birth, happens too frequently to children in their mother's womb; the vessels may be too much dilated at the time of impregnation, and from the smallest dilatation beyond their proper diameter, the accident almost always continues encreasing, because this network is not confined by any bordering part: hence it comes, that these marks (which are falsely ascribed to the imagination of the mother, who has longed for claret, or has had red wine spilt over her,) extend themselves, cause an elevation, and jet out beyond the rest of the skin, and occasion frequently a considerable deformity. A great anatomist has observed, that this vascular network is differently disposed and shaped, in different parts of the body, that it is quite different in the skin of the face from any where else, that it is even very different in different parts of the face;

face; and this learned man has concluded from it, that this perhaps explains the reason why some parts of the body are red, rather than others.

'Tis without doubt on account of this difference, that the marks which resemble red wine happen more frequently in the face, than any other part of the body; in fact one part becomes more red than another, in proportion only to the greater or less resistance, the blood meets with in passing into this vascular network. The redness shows itself with more ease in the face, than any other part, because the blood finds less difficulty there in passing into this network, than in any other part; and therefore can pass into it in a greater quantity, without so considerable dilatation, as must happen any where else; thus a slight force which would have no effect in any other part, will produce in the face a sufficient effect; and therefore the face is more subject to these kind of marks than any other part.

This dilatation of the vessels is very perceivable, if you examine these marks with a good microscope, you may see the motion of the red globules which give them their red colour, which is a circum-

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stance very much in favour of the explanation I have given.

Give me leave to ask you madam, if you never remarked that all the fruits, flowers, and resemblances of wine, which you have seen in children, were always of a red colour? you never saw the resemblance of green gooseberries or currants, though through the depravation of their taste, pregnant women sometimes long for them with the greatest eagerness. Imagination has never been accused of painting a carnation, or an anemone, distinguished by the greenness of their cup, and the admirable mixture of their colours, or a jonquille. If the force of Imagination, could make on the skin the shape of a flower or fruit, why could it not also paint their colours on the skin? 'tis their colours which most strike the fancy, attract our looks, and excite our admiration and desire; the power of forming parts, of whose internal texture it is entirely ignorant, is attributed to the force of Imagination, at the same time it is evidently proved, that it cannot paint on the skin those objects which have struck it, which it is acquainted with, and has been affected by; if it could act on the different particles of our blood, it would find

find there the proper fund for representing all the colours of objects, which might particularly affect it. Do we not see every day, blue marks, yellow, violet coloured and purple, on the surface of the body? does not the skin sometimes become entirely green? black and brown spots are common; the different combinations of these colours with white and red, produce all the other shades; 'tis true 'tis only by some accident that these different colours appear on the body, but this is always a proof that the foundation of them exist in us, and to produce them, nothing further is required than a change of the combination of the particles of the blood. If you attribute to the force of Imagination, the power of separating from this mixture the red and brown particles, it must equally be able to separate those which are necessary to form all other colours and their shades: whence comes it that this never happens? 'tis because the imagination of the mother has no share in the producing the figures and colours which are seen on the bodies of infants, they are only parts of the skin too much dilated, and as this dilatation affords entrance to the red parts of the blood, they almost all are of a red colour;

I say almost all, because they are sometimes of a dark brown colour, but the cause of this colour has nothing extraordinary in it, since brown spots come on our bodies a long time after our births, as for instance, warts, freckles, black and brown moles, &c. the marks observed on the bodies of children, have at bottom a resemblance with warts, freckles and moles, their difference consists at most in their extent; but a little black spot, and a more extended mark, do not depend on two different causes: every body knows that this brown colour proceeds from the saline and earthy parts of the blood, stop'd at the extremities of the vessels, which by reason of their dilatation, have suffered the more liquid parts of the blood to escape through them. Warts are elongations of the nervous fibres and vessels which creep along under the epidermis or scarf skin; there is no occasion to look for any other cause in children, and without the assistance of the mother's imagination, this dilatation and these accretions may be easily deduced from the principle already established.

The hard black hairs which are frequently scattered over the surface of the black marks, do not at all favour the prejudice

judice which attributes all these marks to the imagination of the mother being affected at the sight of a bear's skin, or the rind of bacon. The hairs which almost every where cover our bodies, are a kind of bulbous plants, which spring up from a bulbous root, placed in the skin, and fat; if these bulbs have been impregnated by too active a fluid, the hair will take an extraordinary growth, like those hyacinths which are raised in water impregnated with salt-petre, or on an hot-bed. There is hardly any part of the body which may not be disfigured by these moles with long hairs, because there are hardly any, which are not sprinkled over with these bulbs from whence they spring: and if it is true, that the whole bodies of some children have been covered over with long frightful hairs, the force of Imagination of a mother left in the middle of a forest, cannot possibly have occasioned it; this deformity depends on the excessive dilatation of the bulbs spread over the whole surface of the skin: some marks appear scaly, no more is required to suppose them owing to an impression received by the mother at the sight of a fish; nothing remains but to decide what fish this can be: all the long figures represent carp, pike,

tench ; and the figures a little rounded, are supposed like soles, flounders, turbot, &c. some discourse of the mother's, determines the doubtful spectators, and makes them unite their votes in favour of some one likeness. Does this fact embarrass you madam? Take your magnifying glass, examine the back of your hand, you will perceive there a prodigious number of little scales, placed on one another, which cover the pores, and are designed to lessen perspiration.

If these scales, magnified by your glass, kept the size they appeared to you to be of thro' your glass, they would be like those which are seen on the skin of some people, and are taken for the scales of fishes: the only difference between them is, that the scales which are met with on the skin of some children, are really much larger than those other scales, because they have been prepared by the action of the impregnating fluid, to receive a more plentiful nourishment.

Add to these reasons madam, what a sad experience shews us every day, I mean the constant succession of the same disease in a particular family, and the fatal power of transmitting it by their alliances. Every body agrees that these disorders are

frequently the consequences of the impregnation, that it is by this means a father transmits them to his latest posterity. These disorders depend on some faults of the viscera; if impregnation then can produce this alteration in the viscera, it can surely cause these changes of the skin.

I am, &c.

L E T T E R XVIII.

The cause of hereditary disorders.

IOWN madam, that in the preceeding letter I have touched but slightly on hereditary disorders, I imagined it was sufficient to recall to your memory a fact so common. You insist on my giving you a more particular account of them, this I agree to, but permit plants and trees to be the objects of our first considerations; to explain to you on every occasion the uniformity which reigns between the animal and vegetable creation, is to unite proofs in favour of the principles I have laid down.

The sap which in a vine has unfolded the bud, and made it push out leaves

and branches loaded with grapes, has prepared on those same branches, buds which will blow the following year, and furnish in their turn new branches, and fresh fruits, from whose new buds there will succeed others from year to year till the branch perishes.

This preparation produced by the sap in the first bud, and all the parts contained in it, which unfold themselves in succession, is a sensible example of the impregnation of the first bud. All these buds, branches, and fruits, were contained in it, they were all impregnated in it. It is true, the action of the impregnating fluid is differently displayed in each of these buds; those which were inclosed in the last fold, a great deal more pressed together than the others, have received a less considerable dilatation; whilst those which should blow first, are in a state capable of receiving from the first year an active and plentiful sap. But this does not hinder the impression at the time of impregnation from subsisting in all, and in consequence of this first impression, their receiving at the time of their compleat unravelling, more or less nourishment, a purer or more gross sap, the quality of which has an influence over
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the qualities of the fruit. It may also happen that the buds which should blow the third year for example, may have resisted too strongly the action of the impregnating juice, in this case their unraveling will be imperfect, they will produce neither blossoms, fruits, nor new buds; but the branch will languish and die.

After this manner madam, the vessels of the human body are extended, unfolded and dilated successively in our infancy and youth. Every part of these vessels must have been impregnated, and then received a greater or less disposition to this unravelling. It may be faulty with respect to the whole seed, and the infant be born deformed, sickly, and soon die; but it may happen likewise, and in fact it does happen, that this vicious impression, taints portions of the vessels, which do not entirely unravel themselves, till the body has nearly compleated its full growth.

The effects of this impression will be then suspended, and remain concealed so long as this portion of the vessel which it has tainted is of no use, but they will show themselves as soon as the vessels are unravelled, and the defect of its unravelling will give birth to a disease incurable

curable from its source, since it takes its rise from a vice of the solids, a disease which appears without any accidents foretelling it, because its birth is fixed to the instant of the unfolding of these particular vessels. These events are familiar, we see them every day, and the constant succession of the same disorder in a long train of descendants, leaves us no room to doubt its having taken its rise from the impregnation of the seed, since that is the only means by which an hereditary disease can be communicated from parents to their children.

You are now acquainted madam, that the parts of the child's body are differently disposed, according as the impregnation has acted on them, the same principle which explains what happens in the liver and lungs, serves to explain what happens in the skin, because all the parts of the body are impregnated the same way only. I have then reason to conclude, that if impregnation produces in the viscera this change, which is the cause of hereditary disorders, it must also be regarded as the cause of those changes which happen to the skin.

I might at present push this scrutiny of this analogy further, and since the effect of the

the impregnation suspended for many years, becomes all at once sensible when the parts are unravelled to a certain degree, nothing hinders my attributing to the same cause, different changes which happen at a certain age, in some families, (as an hereditary right) in the features of the face, and state of the brain ; but all these kind of questions, tho' depending on the principle I have established, would occasion me to ramble too far from my present subject.

I am, &c.

L E T T E R XIX.

The nourishment the child receives in its mother's womb, can occasion the same accidents and deformities which have been hitherto ascribed to an irregular impregnation.

MADAM,

IF I have hitherto looked for the cause of the marks and deformities which appear on the bodies of children, in the fecundation

fecundation of the seed only, it was in order to avoid a confusion of ideas; I think that the nutritious juice which soaks into the seed newly impregnated, may also vary the shape thereof till such time as this seed shall have arrived at a certain degree of extension and solidity. The fecundating liquid opens a passage to a thicker and more active fluid, which in its turn disposes the vessels to receive a juice whose particles have still more consistence and activity. By this gradation, the vessels of the seed, acquire every day a greater extent and dilatation.

This introduction of the nutritious juice is effected doubtless in consequence of the disposition the seed received in impregnation. But whatever proportion has been kept between the impulse of the impregnating fluid, and the resistance of the parts of the seed; however regular the impregnation has been, yet it may happen that there has not been a perfect answerableness between the seed and the nutritious juice. The nutritious juice may have too much activity, or be too viscid; the solids of the seed may either make too great resistance, or yield too much, and hence will result a great part of those inconveniencies which we have hitherto

hitherto made depend on the impregnation alone.

Thus madam, the mother's blood too brisk and too much agitated, will dilate the glands of the skin, and occasion the resemblance of strawberries, mulberries, currants, &c. if by its lentor, or viscosity it cannot dilate the vessels, which make too great a resistance, or penetrate into those, whose diameters are not equal to the grossness of its particles, these vessels will cease, or being nourished, will be but partially, they will not grow in proportion to the others, will be more compact, and will resemble white cicatrices, and according to their accidental disposal, will represent the surface and shape of different objects. There will also happen some shortnings of the fibres of the skin, and thence some strangulations which will hinder the growth of some parts of the child's body; the application of every thing which can be said on this subject is easy, it is hardly more than substituting one term for another, I could not enter into a minuter detail without falling into useless and tedious repetitions. I should be still more exposed to do so, if I attempted to relate to you the mechanism by which the
mother

mother transmits to the child a disposition to hereditary disorders : I shall therefore confine myself to observing that there is no part of the body which cannot be the seed of those distempers ; they depend, as I have already taken notice, on an alteration caused by the impregnation or the first nourishment of the seed, in some of the viscera, or the other parts which are affected by them. There is not one of them but may have a different configuration, according as the impregnation or the first nourishment acts on it. Hence we must conclude that the changes which happen on the skin, must depend on the same cause.

I add further madam, that the presence of this cause, will always procure its effect, that is to say, that the texture and arrangement of the solid parts of the seed, will always undergo an alteration, when the impulse of the fecundating fluid, or the first nutritious juice, is either too weak to dilate, or too active for the vessels to resist properly its effort. Whatever change happens, by this effort of the fluids, the solids will always undergo a proportionable one ; a force greatly superior to their resistance, will produce a very sensible effect, a less force will produce

produce a slighter effect, but there will always result some effect or other from it.

This proportion between the cause and effect, is sought for in vain in the system of the force of imagination, the most considerable marks, are sometimes ascribed to an heedless glance only, or to some weak and transitory desire, whilst the most violent passions are regarded frequently as the cause of some slight impressions. Experience moreover proves that the mother is often agitated by the most violent desires, that her mind is a prey to apprehension and terror, without the least mark on the child's body resulting from it; I could quote a thousand instances, but shall relate only one, of which I was a witness myself. A lady thoroughly satisfied of the force of imagination, longed in her early pregnancy, to eat some lampreys, it was impossible to procure any, in the mean time her longing encreased to such a degree, that she never slept, but she imagined she was surrounded with lampreys which devoured her; she expected her lying-in with the utmost terror, fearing she should be brought to bed of a monster, and her apprehension seemed the better founded,

as a person of her acquaintance, as was reported, was marked with something which was supposed to be like the holes that are observed in the neck of lampreys. She was however happily delivered, and the child was immediately examined before its mother's eyes, and was found free from even the least blemish or mark of any kind.

Those who maintain the force of imagination in pregnant women, must not only know the uncertainty of it, but are also forced to allow of capriciousness in its action, which is past their comprehension. It seems as if the imagination can never be affected with the beautiful, its power is circumscribed to paint deformed objects only. A lady has remarked attentively the beauty of a picture, yet neither would the proportion of the drawing, nor the nobleness and regularity of the features affect her imagination, and be impress'd on the infant's body; no, the child will be born with a frightful drapery about it, or carry in its countenance the paleness of a dying virgin. However beautiful the person may be who is taken notice of by a pregnant woman, their beauty never strikes her imagination, but if by chance the

the person has a small mark on the skin, or the hand; or some slight deformity in the situation of their fingers, 'tis this which affects her imagination, 'tis this which will be marked on the body of the child; surely the child deserves some compensation for this, but it has none at all, because these effects are not produced by the force of the mother's imagination.

Is it then possible that the mother's longing cannot be the cause of any of those marks which appear on the bodies of newborn infants? Do those longings, surprizes, and sudden and involuntary agitations produce no effects? Pardon me madam, there do result some effects from them, they may even occasion marks on the skin of the child; this acknowledgement will perhaps surprize you; if it excites your curiosity, I promise to satisfy you of the truth of this assertion in my next.

I am, &c.

L E T T E R XX.

The mechanism thro' which the force of imagination in pregnant women, can occasion deformities, and disorders, in the body of the child. The likeness of some marks with a particular object, can be the effect of chance only.

MADAM,

IN obedience to your commands, I shall endeavour to determine the force of imagination in pregnant women. You will not find it in the least contradictory to what I have already had the honour of writing to you on this subject.

Objects affect the soul, and in consequence thereof the soul acts upon the body: we are ignorant of the means, but it is not the less true that our passions make very strong impressions on us. Hence our blood is agitated, circulates with violence, puffs up the vessels, and we feel the effort of its impulse in every part of the body. This violent impulse in the blood is sometimes superior to the resistance of the vessels destined to contain it, and experience has frequently
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shewn us, that a spitting of blood, or an apoplexy, has been the consequence, according as the vessels (which were too weak to resist this effort,) were situated in the breast or head. We are subject to passions thro' which the circulation of the blood is suspended, this we experience in some moments of surprize and terror: when the heart is convulsed, it contracts itself with greater violence, and for a much longer space of time, than in it's natural state; hence the blood is thrown with greater rapidity towards the external parts, and cannot be freely returned, because this convulsive contraction of the heart opposes the dilatation of those cavities of the heart, into which the veins should return it, and an excessive and unexpected joy may produce the same effects; the course of the blood might even be entirely stopped, and death be the consequence.

In these two extreams that the passions throw us, I mean either as to the excessive rapidity of the circulation of the blood, or as to the suspension of it's course; it's effort acts generally on all the vessels, and on every particular part; if any of them are overpowered by this effort, it is not because it acted more violently

on that part than another, but because that part was weaker; it is not the motion in general of the blood that fixes the place of the rupture or dilatation of the vessels, but it is the disposition of the vessel that determines the effect.

The blood of the mother passes from her to the child, and returns from the child to the mother; if it's course is precipitate, or suspended in the body of the mother, the child must partake of these different sensations, and by a necessary consequence the blood of the child must make a greater effort upon all the vessels of its body, and those which form the umbilical chord, by which it is joined to the belly of it's mother. The effects are sometimes fatal, the child dies, or the hemorrhage causes a miscarriage.

The effects of this general effort of the blood, so great on certain occasions, in some is confined to the dilatation of the vessels of the skin, or of some miliary glands; which produces currants, strawberries, mulberries, or marks of wine; but always according to the disposition the external vessels were in. This disposition alone, as I had the honour of acquainting you before madam, can determine the particular effects of this general effort; this alone determines the place and figure
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of the mark; all that imagination did, was to excite or suspend the general motion of the blood.

A fact of consequence often cited in favour of the force of imagination, proves clearly what I advance. We are told of a child that fell violently ill, because it's mother, during her pregnancy, saw a person afflicted with the same disorder. The fact is possible; but it furnishes us with a fresh proof against the force of imagination; in fact, madam, were we to suppose that the imagination of the mother can mark the body of the child with the figure of the objects which have struck the mother, we ought always, as has been said before, to restrain that power to objects she could be acquainted with. To tell a country girl of the goodness of a pine-apple, without describing it's form, would never make her have a desire to eat it? In vain her imagination would suggest to her an idea of tastes she has no knowledge of: it would never represent to her the form of a pine-apple; consequently it could never mark the body of the child in her womb, with the resemblance of that fruit.

Let us reason upon this principle, and consider two things in the disorder in

question; the cause of the disorder, and it's external effect; which of these two objects struck the mother? She saw a person in convulsions: but without knowing either the defect of the nervous fibres, or that of the vessels, which causes the disorder: this would escape the sight of the most penetrating anatomists. The sole object that struck the imagination of the mother, and the only thing she is acquainted with, is the figure of a man in convulsions: consequently that external figure only, was what she could mark the child's body with; which nevertheless did not happen. The child is born with that disposition in the brain which causes convulsions. The imagination of the mother which has not impressed upon the body of the child, the figure of the object that she was acquainted with, and which alone struck her, has conveyed into the brain of the infant an impression she has no knowledge of, of which she can have no idea, and which never struck her; you perceive madam, that it is impossible.

This discomposure of the child's brain is in reality a consequence of the terror which affected the mother; but that terror suspending the circulation in general,
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acted on the whole mass of the blood; in the effort to which all the vessels were exposed, those of the brain suffered some alteration; it could not result from any particular impression of the mother's imagination; but because the vessels of the brain made less resistance than those of other parts to counterballance the effect, and gave way too much; hence arose this disposition to convulsions. If the want of resistance had happened in the breast, it would have caused some disorder in the lungs; if it had been in the vessels of the skin, it would have caused a dilatation of the fibres thereof, either in the vessels, or in the glands; and those dilatations might have represented diverse objects. The same terror might have caused all those accidents, because they are only determined by a predisposition, in the different parts of the child's body. In a violent cough, or sneezing, the motion of the blood is greatly accelerated, but the effort is general. If when it is strongest, a hand was already indisposed, it would feel an acute pain; the motion impressed by the cough would cause, but it would not determine the place of the pain; it would be felt in the foot, if that was indisposed, instead

of the hand. The pain that coughing or sneezing would give the foot or hand when indisposed, would equally be excited by whatever could agitate the blood, or suspend it's course: a fever or sudden heat would produce the same effect. The same holds good as to the body of the child: the want of resistance being once allowed in the brain, it must consequently occasion a disposition to convulsive disorders, whatever was the cause of the mother's fright. The unexpected sight of the person most dear to her, would produce the same effect, if it occasioned great surprize: it is sufficient (if the course of the blood was violently suspended) to make the brain suffer in consequence of the supposed predisposition.

Surely madam, such strong reasons must convince. I draw this consequence from them: that two different objects, which had successively struck the mother, might concur to produce a mark upon the body of the child, which had no allusion to those objects. I'll suppose, for example, that the skin which covers the hand of the child, was not solid enough to resist a great effort of the blood; if in that case the mother was moved with a strong apprehension at the sight
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of a spider, the suspension of the course of the blood which would ensue, would augment the general effort, the vessels of the hand would be dilated, and a red spot would appear in consequence thereof; the dilated vessels having much less spring, are more disposed to a greater relaxation; if then the mother was to feel a lively emotion of joy or anger, her blood would be agitated thereby, and this agitation would communicate itself to the blood of the child; the vessels already dilated by terror, at the sight of a spider, would be more dilated in the second effort, caused by joy or anger; the red spot would be enlarged: the objects that struck the mother have no relation to one another, nevertheless they have concurred to the same effect, because they have augmented the general effort of the blood on the vessels; to this only is their power confined: a fever might produce or encrease the same effect; what is particular, depends only on the disposition of the part.

After what has been said, can it be objected madam, that children are born with marks which their mothers foretold, on account of some objects that had struck their imagination? You have seen how incapable imagination is, to fix the

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the place or the form of a mark; that this depends on the disposition of the vessels; and as nothing can determine their disposition, this must be looked on as the effect of meer chance. A mark which has been foretold, has once in 1000 times happened to answer its description; another effect of chance, which may serve to support the prejudice of those who do not reason, but can have no influence on those, who, like you madam, are only convinced by truth.

I am, &c.

L E T T E R XXI.

*Of what is understood by the effect of chance.
Dendrites, and other figured stones.*

MADAM,

YOUR remarks are just: it is dangerous to regard as an effect of chance, those singularities which the defenders of the force of Imagination in pregnant women, alledge as proofs of their opinion. They fancy that chance is quoted as an impenetrable, but acting cause; but I do not use this expression in that sense, I look upon (as the effect of chance,)

chance,) the result of certain combinations and events, which depend on no particular independant cause, vary perpetually, and are met with by accident only. 'Tis thus we regard as the effect of mere chance, all the different figures which are seen in flints, stones, and in agates; such as plans of cities, figures of plants, trees, animals, &c. I quote madam, facts which are familiar to you; recollect a large collection of the finest dendrites; you there see plants distinguished by their stalks, their leaves, flowers and seeds, all differently coloured; you remark trees whose branches arise from a trunk covered with moss, which spread themselves regularly to form a round thicket; others resemble a row of trees and bushes planted on the side of a river, and reflected by the mirror of its water? these dwarfs growing on a bottom red as a Volcano, bear on their brown stems, flowers of a lively red; some are like human heads dressed in square bonnets, of which one may imagine one recollects the features: it would be endless to remind you of every thing this rich collection contains. It is not a busy imagination which has produced these figures; they have been formed by the condensation of a fluid
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which has insinuated itself into different parts of the stone; according as it met with greater or less ease to strain through, towards one side, rather than towards the other, its track has formed different figures. This facility of straining through the pores of the stone, which it meets with in one place more than another, depends on the situation of the internal parts of the stone, an arrangement, which no independant cause can have power to direct, and which is subject to change: the course of the overflowing of this juice, and the effect resulting from it, are then both the mere effect of chance. If chance, taken in this sense, occasions such perfect resemblances, I foresee no inconvenience in ascribing to it, those we see on the bodies of children; I have proved that the force of Imagination cannot mark any thing, and that the figures observed there, depend on the greater or less resistance of the solids, this greater or less resistance of the solids, not being determined by any independant cause, varies infinitely, and consequently produces a variety of figures. If they seem to represent a currant, rather than a carnation, it is then only the effect of mere chance; an event which depends

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on chance, cannot be foreseen, and the correspondence of a like event, with the prediction, however exact it may be, ought never to be regarded but as a second effect of chance.

I am, &c.

L E T T E R XXII.

Of the child born with its limbs fractured.

MADAM,

THE case of a child's limbs being fractured, does not make in the least against my assertion: it only proves that the ideas, the passions, and the fears of the mother, communicate themselves to the child. I believe I have thoroughly convinced you already, of the impossibility of such a communication; but if it was as true as it is false, what wou'd be the consequence? the child wou'd be affected at the sight of a distorted person, in the same manner as the mother. Since the bones of the mother are not broke, thro' the terror the mother is thrown into, the bones of the child cannot be affected by it; since the terror of the child, in proportion to the state of its brain, wou'd only be followed

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followed by efforts proportioned to the weakness of all its parts. But let us suppose, madam, all proportion destroyed, and terror in the child, as strong as in the mother; the only result wou'd be, that the effect wou'd be much greater than the weakness of the child could bear. What then are the effects of fear? Experience tells us every day what they are.

A convulsive contraction of the heart, of the breast, and of all the muscles of the belly. In this situation, the blood is thrown out of the heart with violence, and it's return is suspended: all these different impressions can only cause a general motion of the blood, the consequence of which would be the displacing of a part, as much only as it was predisposed thereto. Therefore the effect of a very great fright might suspend the circulation of the blood, so as to suffocate the child; but in the general motion, nothing could cause an impression upon the arms and legs, sooner than on the other parts of the body, if they were not already disposed to it, independently of the mother's imagination: I have already giving you my reasons for this.

But, madam, to admit every thing that favours the opinion I write against, I'll suppose, that by the effect of the fright,

fright, the child fell into convulsions, which particularly affected it's arms and legs; yet it's bones would not be broke. Convulsions may dislocate an arm, but cannot break it, because being pliant, it easily yields to the effort that draws it; in convulsions, motion is violent and involuntary; but it is performed by the same parts as perform moderate and voluntary motion. It is always by the same muscles, that the arm is voluntarily moved towards the breast, or forced by the violence of convulsions. In both motions the bone of the arm does not resist; turning every way in a round cavity, it easily yields to all kind of motion; therefore cannot break. It is said nevertheless that a contusion has been seen, which formed a demicircle, and spread over half the arm. This is another proof it cannot be the effect of convulsions. In fact, madam, the muscles draw back the parts, towards the fixed points to which they are attached, because the action of muscles depends on their shortning their fibres, and consequently the extremities approach nearer the centre. If, during a violent convulsive fit, a contusion happens to a muscle, it is by the rupture of some vessels, and consequently, *cæteris paribus*, that rupture must happen

pen in the place where the greatest effort is exerted; the greatest effort would be in the centre of the muscle. Therefore, supposing, in a general convulsion of the muscles of the arm, the fibres of all the muscles are contused or ruptured, in the centre of those muscles; yet there would happen no circular contusion, since the centre of all those muscles answers to different points thro' the whole length of the arm. Whenever those muscles have suffered a contusion, we must seek for another cause than convulsions, to explain the marks on the skin, which has no connexion with the muscles, and which in the most violent convulsions, can only receive an impression in consequence of the general motion of the blood, or by the interruption of the same only.

These reunited reasons taken from the mechanism of the parts, prove that the most violent convulsions can neither break the bone of the arm of the infant in its mother's womb, nor mark on its skin these demicircular contusions; so that supposing the fright was communicated from the mother to her child, and that in the child, it was not in proportion to the weakness of its brain, there could
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not result from it any one of those accidents which have been attributed thereto.

Since then, it is certain, that the mother's imagination cannot produce these effects, by any communication of her ideas or fears, the cause on which they depend, must be sought for elsewhere, otherwise you will not allow that I have sufficiently cleared up this objection. Neither the motion of the blood in the child, nor the proportion between the resistance of the parts, with its impulse, can be the cause of these accidents; I can therein find out no mechanism which explains the correspondence that is met with between the contusion of the skin of the muscles, and the fracture of the bones: since these accidents answer to one same point; they must have been caused at the same time; there is no communication between these parts, capable of making them subservient to the action of any one same internal cause, nor is there more than one external cause, capable of producing them.

There is one cause which seems the more probable, as it is the natural consequence of those sudden and violent im-

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pressions, which objects of terror cause in us.

There is nobody but has experienced, in these moments, a violent contraction of the muscles of the belly: two of these muscles are extended anteriorly the whole length of the belly, and are attached to two fixed points: externally they are divided into several portions, like so many different muscles placed end ways together, and intersected by transverse tendons; it is true, these transverse tendons do not always penetrate the whole depth of the muscles, but it happens sometimes that they are very perceivable on their internal surface. This fact once established, let us consider the situation of the infant in its mother's womb. This situation varies, but it is most commonly placed there with its head upwards, with the face turned forwards, the arms stretched out the length of the body, a little forwards, the thighs bent in such a manner that the legs hang perpendicular to the rest of the body. By its size it pushes outwards all the muscles of the belly, The transverse tendons yield less to this effort, than the other parts of the muscles; their texture being more compact hinders their dilatation. When these
muscles

muscles are contracted, they exert a great force to take their direction, and strongly compress the body of the child, which opposes their action; but this compression is greatest in those parts which are immediately acted on by these transverse tendons, because every one of these is to be looked upon as the termination and fixed point of two muscles. The effort by which they approach the right line from whence the body of the child removes them, will be composed of the action of two muscles. Add to this force, the solidity of these transverse tendons, and you may easily make a comparison between them, and a rope applied to the arms and legs of the child, by violent jerks. There cannot be the least doubt but there would result from this, contusions of the skin, muscles, and bones of the tender body of the child. These compressions would at the same time, and in the corresponding points, confound the disposition of the vessels, the distribution of the nutritious juice, and leave impressions which in the sequel can never be effaced.

If you have the least doubt madam, of these muscles being able to produce

so violent a compression, recollect, that in a weak person, in the access of an hysterical fit, the convulsion of these muscles resists the force of several strong people ; but you will perhaps ask, if the structure of these muscles is of such a kind as to make such a strong compression, whence happens it that this accident is so rare that hardly two instances of it are to be met with ? I might ask you the same question, supposing the power of imagination : these accidents would happen more frequently if the force of imagination was capable of producing them. But I answer more positively, that the structure of these muscles cannot always produce these effects, because it is very seldom that the transverse tendons pass entirely thro' the internal surface of the muscles ; and this precaution of nature, (if I may be allowed the expression,) is a proof of the danger to which children in the womb would have been exposed, if these transverse tendons had constantly penetrated thro' the internal surface of the muscles, and were as compact, and as apparent on the internal as the external surface.

After this explication, it is easy to decide how far the sight of a person racked on
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the wheel, and the imagination of the mother, which has been struck by this object, have contributed to form these contusions and fractures in the child's body. The whole is reduced to the convulsion of two muscles. Could not this convulsion be excited, but at the sight of this unhappy wretch only? The fall of an house, the unexpected report of a gun, might produce the same effect. It is not then the object of the fright which determines the nature of the marks observed on the body of the child; but the contraction of the muscles. Any other object under the same circumstances might produce the same accident. Thus madam, you must be thoroughly convinced, that this example which has so much imposed on Mallebranche, proves nothing at all in favour of the force of imagination in pregnant women.

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